

Appendix

Appendix 1.1

Sizewell Geotechnical Report

Sizewell

Geotechnical Desk Study

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Sizewell

Geotechnical Desk Study

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Geotechnical Desk Study

Capabilities on project:
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1. Introduction

1.1. Background

As part of the "Sizewell C" development, Suffolk County Council is assessing ways to reduce the potential impact of traffic this project may pose on the B1122. AECOM's geotechnical team has been asked to review the site related geotechnical information. The objectives of this report are:

1. Determination of the hydrological and hydrogeological setting
2. Initial assessment of likely ground conditions on site and associated geotechnical constraints;
3. Review the past history and current use of the site
4. Identify any geological hazards and/ or ground conditions that will require special measures
5. Identify potential sources of contamination

1.2. Proposed Development

Communities on the B1122 have experienced a significant impact from traffic associated with the construction of Sizewell B nuclear power station. Suffolk County Council had commissioned Trevor Crocker&Parnters to assess options to mitigate the impact on the communities.

Suffolk County Council has now asked AECOM to develop two of the options originally developed for the "Sizewell B" development, notably the "B1122 Local Bypass option" and the "D2 Route option".

1.3. Limitations of the report

The information reviewed for the preparation of this study was obtained from the British Geological Survey (BGS) website (Ref.1) and the Environment Agency website (Ref. 2). No liability can be accepted for the detailed accuracy or otherwise of any of the reports or documents prepared by others for the client or for third parties, or for any associated errors or omissions.

The interpretations and conclusions provided in this report are AECOM's judgement based on the site conditions as revealed from the information available at the time of the preparation of report.

Any risks identified in this report are perceived, based on the information reviewed; actual risks can only be assessed following a physical investigation on site.

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2. Sources of Information

2.1. General Sources

The principal sources of information for this desk study include the following:

- British Geological Survey (BGS) geological maps and boreholes (Ref 1)
- Environment Agency website (Ref. 2)
- Site Visit (Appendix A)

2.2. Previous investigations

No information from previous ground investigations and/ or other relevant reports were available at the time of compiling this report.

2.3. Site visit

A site visit survey was undertaken by AECOM on the 11th of February 2014 to supplement the principal sources of information listed above. The objectives of this walkover were to obtain visual evidence of the general site configuration, arrangement and layout, features and structures on site and access details. A photographic record of the site walk over is included in Appendix A.

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3. Site Description

3.1. General

The locations of the “B1122 Local Bypass” and “Route D2” options can be seen in Figure 1 and Figure 2, respectively. The approximate OS coordinates at the centre of the “B1122 Local Bypass” and “Route D2” locations are 643260,266150 and 641000,262500, respectively. The proposed routes can be seen in Annex A-Drawings.



Figure 1: Site location of B1122 Local Bypass

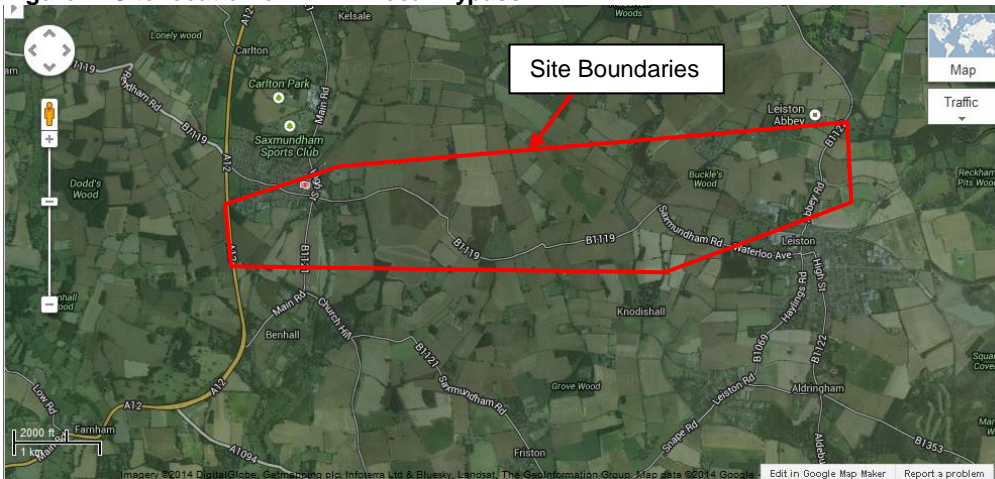


Figure 2: Site Location of Route D2

3.2. Geomorphology

The area is mostly used for agricultural purposes with few residential areas with mostly open grazing fields. The area was relatively flat some occasional steep dips. A more detailed site walkover and topographical survey for the site is recommended and will provide more detailed understanding of the topography.

3.3. Historical Development

Publicly available online historical maps (Ref.4) suggest that the sites were mostly of agricultural use with some residential areas. The search did not indicate any significant change of the use of the areas over the years (1884-present). Purchase of the Envirocheck report is recommended for more detailed information.

3.4. Groundwater

The Environment Agency (E.A.) has designated Groundwater Source Protection Zones (SPZs) for approximately 2,000 groundwater supply sources. The groundwater from these zones is used in the public drinking water supply and it is

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essential that these sources are protected from contamination. The closer the proposed activity to the actual ground water supply source, the greater the risk. The maps show three main zones (inner, outer and total catchment) and a fourth zone of special interest, which is occasionally applied, to a groundwater source.

SPZ1-Inner protection zone (red)

Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.

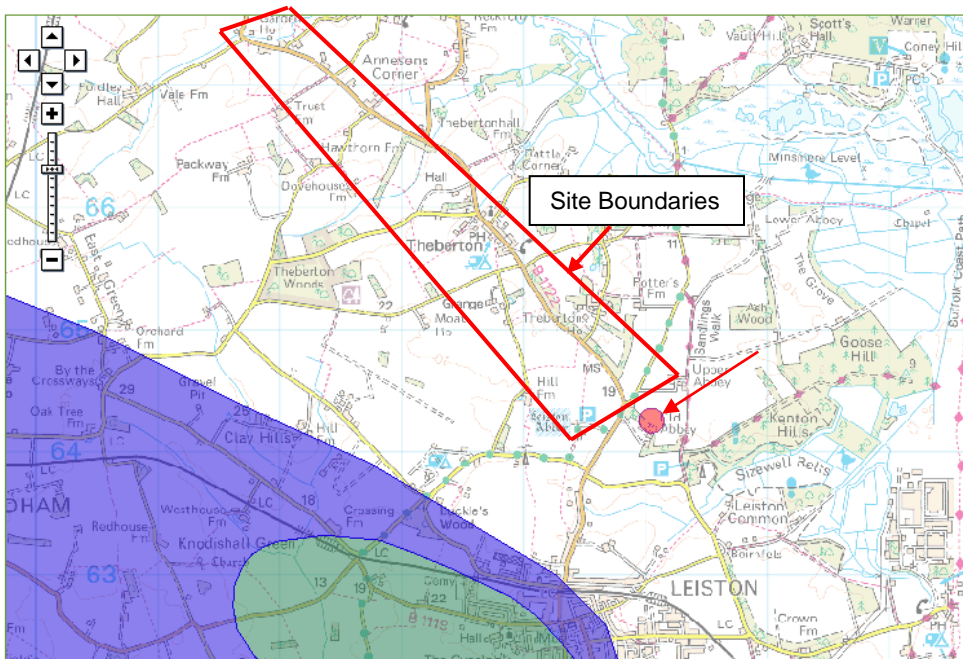
SPZ2-Outer protection zone (green)

Defined by a 400 day travel time from a point below the water table. A previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

SPZ3-Source catchment protection zone (blue)

Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75 . There is still the need to define individual source protection areas to assist operators in catchment management

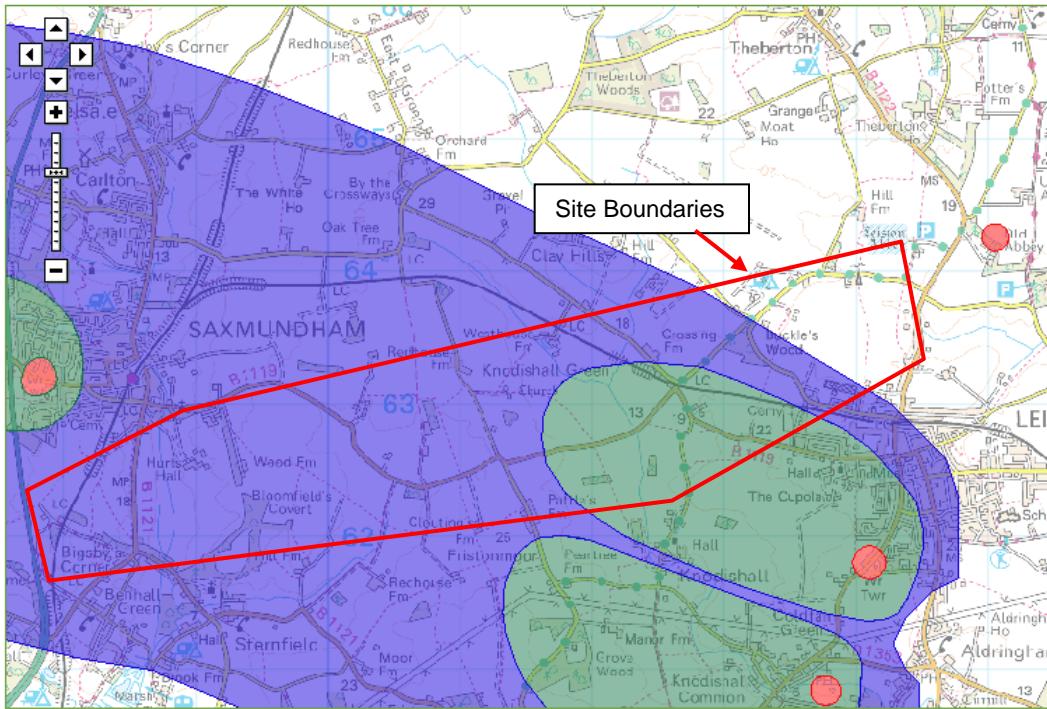
An area described as a "Source Protection Zone 1" is located at a close proximity to the South-east side of the alignment of the B1122 Local Bypass option. The majority of the Route D2 option is within a "Source Protection Zone 3" and a small area at the middle of the route is described as "Source Protection Zone 2". Figure 3 and 4 below show the groundwater source protection zones in relation to the two proposed options.



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Figure 3: Groundwater source protection zones (B1122 Local Bypass option)



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Figure 4: Groundwater source protection zones (Route D2 option)

3.5. Flood risk

The EA website indicates that there is relatively low flood risk at most of the area covered by the “B1122 Local Bypass” option. The main point of concern is the area close to Middleton Moor (Figure 5). For the “Route D2” option, there is a flood risk at the east part of the alignment and at the middle of the scheme (Figure 6).

The dark blue colour in Figure 5 and Figure 6 shows the area that in the absence of flood defenses could be affected by flooding with the possibility of a flood event up to 1 per cent (1 in 100) chance of occurring each year. For the light blue the likelihood of a major flood event in the absence of flood defenses is 0.1 per cent (1 in 1000) chance of occurring each year.

The absence of any marking suggests that flooding is very unlikely, less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year.

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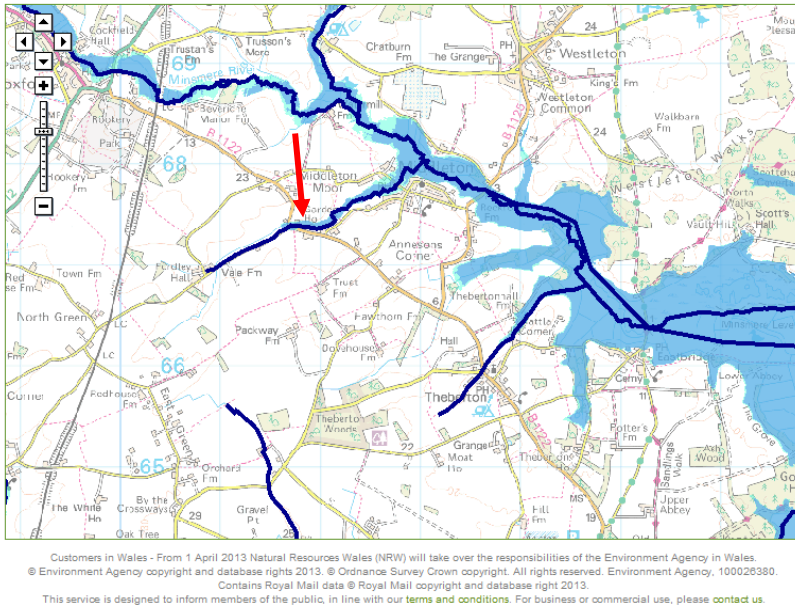


Figure 5: Flood map of the site (B1122 Local Bypass option)

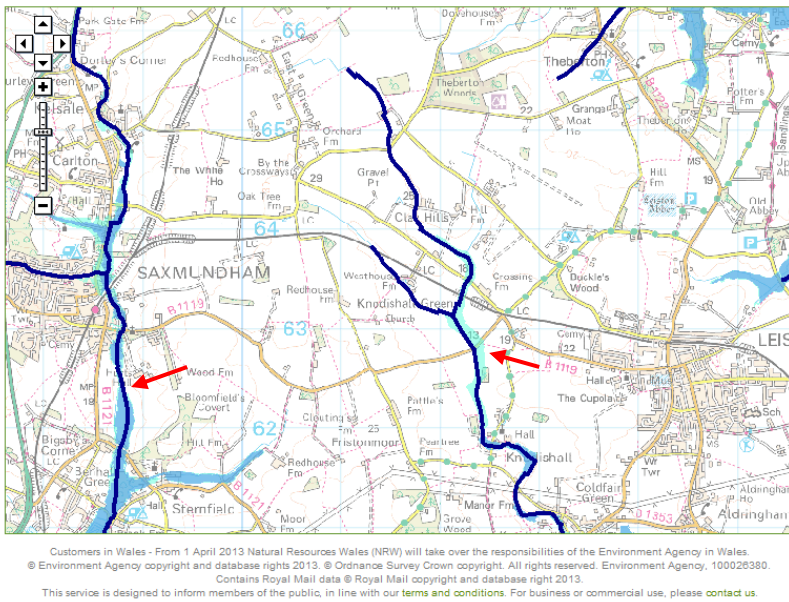


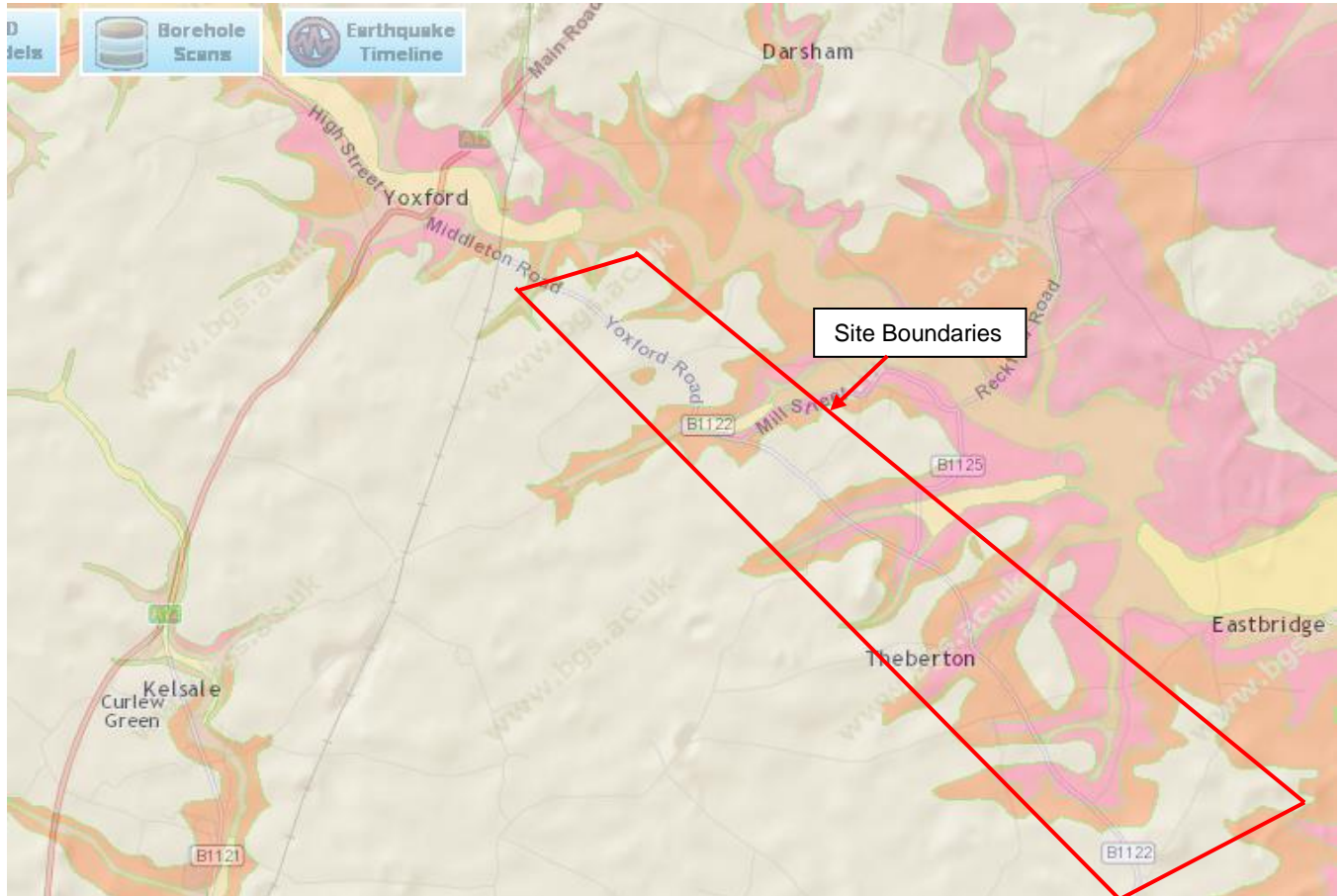
Figure 6: Flood map of the site (Route D2 option)

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4. Ground Conditions

4.1. General site geology

The geology of the site was assessed using information from the BGS website. Information from previous ground investigation and/or other relevant reports was available at the time of compiling this desk study report. The geological maps from the BGS website can be seen in Figure 7 and Figure 8 for the “B1122 Local Bypass” and “Route D2” options respectively .



Map Key (close this window to activate map)

Superficial deposits

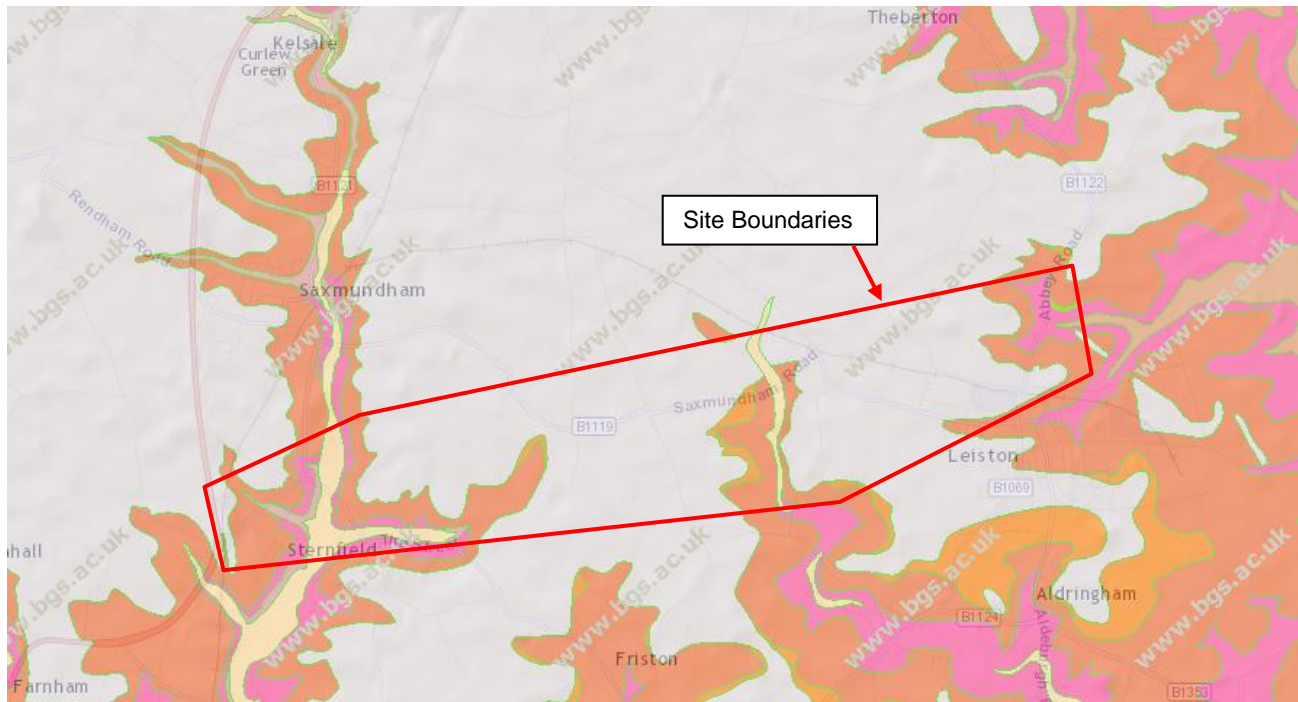
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- TIDAL FLAT DEPOSITS - CLAY AND SILT
- LOWESTOFT FORMATION - DIAMICTON
- LOWESTOFT FORMATION - SAND AND GRAVEL
- ALLUVIAL FAN DEPOSITS - SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- MARINE BEACH DEPOSITS - SAND AND GRAVEL
- PEAT - PEAT
- SAND AND GRAVEL OF UNCERTAIN AGE AND ORIGIN - SAND AND GRAVEL

Bedrock geology

- CRAG GROUP - GRAVEL
- CRAG GROUP - SAND

Figure 7: Geological map of the B1122 Local Bypass option (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>)

Capabilities on project:
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Map Key (close this window to activate map)

1:50 000 scale geology

Superficial deposits

- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- LOWESTOFT FORMATION - DIAMICTON
- LOWESTOFT FORMATION - CLAY AND SILT
- LOWESTOFT FORMATION - SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- PEAT - PEAT

Bedrock geology

- CHILLESFORD CLAY MEMBER - CLAY, SILTY
- CRAG GROUP - SAND

Figure 8: Geological map of the Route D2 option (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>)

Solid Geology

The solid geology of the site, as seen in the “Geology of Britain” map (Ref.1), consists of the Crag Group Formation.

The Crag Group Formation is described by the BGS lexicon to generally consist of shallow-water marine and estuarine sands and gravels, locally with bands of silts and clays.

The Crag formation could be weakly cemented.

Superficial Geology

The superficial deposits encountered in both of the options consist of Glacial Till - Lowestoft Formation- Diamicton (poorly sorted sands and gravels in a clay matrix) and Lowestoft Formation – sands & gravels; with local areas of Alluvium.

The BGS lexicon describes the Lowestoft Formation as an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content.

Alluvium is normally soft to firm, poorly consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravels.

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4.2. Summary of the strata encountered

The ground conditions were identified from information available about the sites from the BGS website. Table 1 and Table 2 summarise the thicknesses and levels of the strata encountered in 6 historical boreholes for " B1122 Local Bypass" option and 8 historical boreholes for " Route D2" option. The boreholes are available on the BGS website. They are close to the proposed route but they are dated. An additional ground investigation will provide more accurate ground profile.

Table 1: Ground profile summary (B1122 Local Bypass option)

Relevant boreholes	Geology	Thickness			Top of stratum
		Minimum (m)	Maximum (m)	Average (m)	Average (m bgl)
TM46NW3, TM46NW6, TM46NW7, TM46NW10, TM46NW27, TM46SE48	Topsoil	0.2	0.45	0.33	0
	Lowestoft Formation(cohesive or non-cohesive)	6.1	19	11.4	0.1
	Crag Group	7.9	40	19.3	14.9

Table 2: Ground profile summary (Route D2)

Relevant boreholes	Geology	Thickness			Top of stratum
		Minimum (m)	Maximum (m)	Average (m)	Average (m bgl)
TM46SE1, TM46SE35, TM46SE43, TM46SE44, TM46SE45, TM46SW2, TM46SW3, TM46SW9, TM46SW27	Topsoil	0.25	1	0.4	0
	Lowestoft Formation(cohesive or non-cohesive)	5.5	11.9	8.7	0.4
	Crag Group	31	41	35.6	6
	London Clay	10	15	12.5	44
	Lambeth Group (referred to as Redding Beds)	6.4	22	14.5	44
	Chalk	16.2	27.4	21.8	53.2

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4.3. Interpretation of the ground profile

Based on the limited available information it is only possible to provide a generic ground model for each of the sites. Table 3 and Table 4 show the preliminary ground profiles for option "B1122 Local Bypass" and "Route D2" respectively.

Table 3: Preliminary and Indicative Interpretation of ground profile (B1122 Local Bypass option)

Depth, m	Strata	Notes
0-0.3	Topsoil	Expected to be stripped off prior to construction.
0.3-11.3	Lowestoft Formation(cohesive or non-cohesive)	The majority of the scheme is overlain by cohesive Lowestoft Formation.
11.3-40.3	Crag Group	A suite of shallow-water marine and estuarine sands and gravels, locally with bands of silts and clays weakly cement rock
Not encountered	London Clay	A marine formation, usually stiff to very stiff silty clay or a clayey silt in the basement beds, which is usually bluish grey but becomes brown when weathered.
Not encountered	Lambeth Group (referred to as Redding Beds)	Mixed silty sandy clay or silty sand

Table 4: : Preliminary and Indicative Interpretation of ground profile (Route D2)

Depth, m	Strata	Notes
0-0.4	Topsoil	Expected to be stripped off prior to construction.
0.4-8.1	Lowestoft Formation(cohesive or non-cohesive)	The majority of the scheme is overlain by cohesive Lowestoft Formation.
8.1-43.7	Crag Group	A suite of shallow-water marine and estuarine sands and gravels, locally with bands of silts and clays weakly cement rock
43.7-56.2	London Clay	A marine formation, usually stiff to very stiff silty clay or a clayey silt in the basement beds, which is usually bluish grey but becomes brown when weathered.
56.2-70.7	Lambeth Group (referred to as Redding Beds)	Mixed silty sandy clay or silty sand
70.7-Depth not proven	Chalk	Hard chalk with flints

Alluvium, although indicated as "present" in the geological maps (Figure 7 and Figure 8) appears to have small extends hence it was not included in the preliminary ground profiles. When present, the alluvial deposits are likely to be soft sandy clay with low strength and may be compressible.

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5. Preliminary Engineering Assessment

This section discusses the geotechnical design and construction considerations for the proposed development.

5.1. Proposed Development

The alignments of the two proposed options are shown in Annex A-Drawings.

5.2. Cuttings and embankments

The proposed roads will run in cuttings and on embankments as required to suit the alignment and the topography.

The material arising from the cuttings is likely to be suitable for reuse as Class 1A/B and Class 2A/2B subject to further ground investigation work.

Without any information of strength properties of the in situ material, a safe slope angle cannot be assessed. Previous experience working in the Lowestoft formation, suggests that a slope of 1V:2.5H will be adequate for initial planning.

5.3. Subgrade

The CBR values of the materials expected to be found in the cutting areas and the potential fill materials for the embankments will need to be evaluated with ground investigation.

The founding soil at the cutting areas will likely be Lowestoft (cohesive or non-cohesive) or Crag formation. The cohesive Lowestoft Formation will likely have CBR values of around 3.5% whereas the CBR for the non-cohesive Lowestoft and the Crag Formation may be considerably higher up to 10%.

5.4. Culverts and Bridges

Where the proposed routes crosses the river tributaries, a culvert or a bridge will be required.

The founding and the surrounding soil properties are important for the construction of culverts. If the construction requires excavations, then an appropriate slope or temporary support should be considered.

Total and differential settlement of the culvert is another issue that needs to be considered during design. Solutions to the presence of soft soils include the removal of the deposits if they are relatively thin and the construction of a geogrid reinforced foundation to reduce differential settlement.

Bridge abutments are likely to be constructed on alluvial deposits. If the alluvial deposits are not able to support the loads from the piers and abutments, piled foundations will be required to transfer loading to more competent strata. The piled foundations would support the loads using both shaft and end bearing in the Lowestoft Till and the Crag Group deposits. The design approach adopted for determining the capacity of either traditionally bored or CFA piles would likely ignore the shaft friction component generated from the Alluvium. The design of traditionally bored or CFA piles will be carried out as per BS EN 1997 (Parts 1) (Ref X).

CFA piles are generally found to be the most economical option for the type of structures proposed. However, CFA piles have a limitation on pile diameter and length. Obstructions can also limit the use of CFA piles. Man-made obstructions such as existing buried foundations together with natural obstructions such as hard ground or continuous layers of hard nodular flints might prove difficult to break through. None of these is expected at the sites for the bridge but needs to be confirmed during the ground investigation.

5.5. Contaminated Land

The site is used mainly for agricultural purposes with few residential areas and is mostly partitioned into open grazing fields. A quick review of older maps did not indicate any significant changes of use over the years (1884- present). There were no obvious sources of contamination to be observed during the site visit. It is unlikely that the soil is be contaminated. However a more detailed assessment will be carried out to identify any contamination issues.

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6. Project Risks

6.1. Geological Hazards

Alluvial deposits

Alluvial deposits are likely to be loose or soft, unconsolidated river-deposited sediments, with low strength and high compressibility. Further investigation will determine the soil properties and the thickness and extend of the alluvial deposits. It is likely that the ground water table may be at or above the water level in the river and that excavations will need to be dewatered.

As working on alluvial deposits, may have engineering implications, some of the methods that these can be mitigate are shown below:

- (Low strength for construction of foundations): Pile foundations to transfer the load to stronger materials
- (Settlement): Pre-loading of the deposits
- (Settlement): Use of band drains
- (Settlement): Geosynthetics to reinforce and separate the earthworks materials

6.2. Flood risk

The EA website indicates that there is a risk of flood at the areas in close proximity to river tributaries.

6.3. Potential Sources of contamination

The site is mainly used for agricultural purposes and it is therefore unlikely that it will be contaminated. The site visit on the 11th of February did not indicate any obvious source of contamination on site.

The EA's website does not show any authorised or historic landfills at a close proximity to the site and no pollution incidence were reported.

A more detailed contaminated land assessment will be carried out by the Environmental team of AECOM and it will be reported in a separate report.

6.4. Risk register

Preliminary geotechnical risks have been assessed and a geotechnical risk register has been prepared in Table 3

Table 5: Risk register

Hazard/ Risk	Cause	P	I	R	Consequence	Mitigation measure/ Note
Structures						
Settlement	Compression of fills and very soft soils	2	4	8	Vertical settlement exceeding acceptable tolerances	Ground investigation to include/ preclude cause and design mitigation measures. Design piled solutions to limit settlement where required.
Differential settlement	Varying ground conditions	1	4	8	Settlement exceeding acceptable tolerances	Ground investigation to include/ preclude cause and design mitigation measures. Design piled solutions to limit settlement where required.
Collapse of excavations (investigation and construction)	High groundwater level, unstable soils	2	3	6	Injury to personnel/public, damage to machinery/surrounding infrastructure, delay to project	Need of adequate sidewall protection/support during ground investigation. Detailed method statements to be provided.
Infrastructure – Services						
Service	Differential	3	5	15	Disruption to	Service plans to be sent to

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disruption	settlement				services, cost of remediation and possible compensation claims	the contractor prior to any ground investigation. CAT scanning prior to ground investigation.
Earthworks						
Pumping water from excavations	Removal of fines leads to settlement when soil is later loaded	3	5	15	Possible settlement of structures	All pumps to be filtered
Contamination and chemical attack						
Aggressive ground	High sulphate content and low pH. Marine conditions, fill	3	3	9	Attack of buried concrete structures	Future ground investigation to include testing to establish potential for aggressive ground and allow appropriate mitigation measures to be designed and grades of concrete to be determined.
Unforeseen Contamination	Contamination from previous land use on or around site	4	2	8	Adverse effects on sensitive receptors	Future ground investigation to include for contamination testing.

1. Risk rating as given in Appendix C HD22/08 i.e. Risk Rating (R) = Probability (P) X Impact (I).
2. Impact based on construction time and cost.

Probability (P)	
Very likely	
Likely	
Probable	
Unlikely	
Negligible	

Impact (I)	
Very High	
High	
Medium	
Low	
Very Low	

Risk Rating	Description
Severe (20 – 25)	High probability of occurrence and a high impact on the proposed scheme
High (14 – 19)	Medium to high probability of occurrence and also a medium to high impact on the proposed scheme
Medium (8 – 12)	Medium to high probability of occurrence or a medium to high impact on the proposed scheme
Low (3 – 7)	Low to medium probability of occurrence or low to medium impact on the proposed scheme
Negligible (1 – 2)	Negligible to low probability of occurrence and a negligible to low impact on the proposed scheme

7. Conclusions and recommendations

- The superficial deposits encountered on both sites consist of the Lowestoft Formation (Diamicton or Sand and Gravels), with local areas of Alluvium.
- The solid geology of both sites consists of the Crag Group formation.
- Groundwater levels were not identified, but a conservative approach would assume that water levels are likely to be greater than the water level in the rivers.
- Material that will be removed from the cuttings, subject to further ground investigation and classification tests, may be used as Class 1A/B and Class 2A/2B
- A slope of 1V:2.5H is generally safe in cuttings/ embankments built in the Lowestoft formation, subject to further ground investigation and laboratory testing
- Regarding the hazards related to the site, it was observed that:
 - Alluvial deposits are expected at the area around the river tributaries. Cohesive alluvial deposits are known for their instability issues and remediation may be needed.
 - There is a flood risk for the area at a close proximity to the river tributaries. (Section 3.5)
 - Considering that the site is used mainly for agricultural purposes with few residential settlements and is mostly partitioned into open grazing fields, there's a low risk of contamination. A more detailed contaminated land assessment will be required.
- A detailed ground investigation will be required for an assessment of the ground conditions along the routes.

Appendix 1.2

B1122 and D2 Sizewell Study- Air Quality Appendix

Appendix Air Quality

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1.1 Air Quality Objectives and Limit Values

1.1.1 Air Quality Objective and Limit Values

The air quality objectives and limit values currently applying to the UK can therefore be split into two groups. Each has a different legal status and is therefore handled differently within the framework of UK air quality policy. These are:

- UK air quality objectives set down in regulations for the purposes of local air quality management which are targets (Table A3.1.1); and
- EU limit values transcribed into UK legislation which are mandatory (Table A3.1.2).

Table A3.1.1: UK air quality objectives

Pollutant	National Air Quality Objective		Date to be Achieved by and Maintained thereafter
	Concentration	Measured as	
Benzene	16.25 µg/m ³	Running Annual Mean	31.12.2003
Benzene	5.0 µg/m ³	Annual Mean	31.12.2010
1,3-Butadiene	2.25 µg/m ³	Running Annual Mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Maximum Daily Running 8-hour Mean	31.12.2003
Lead	0.5 µg/m ³	Annual Mean	31.12.2004
	0.25 µg/m ³		31.12.2008
Nitrogen Dioxide	200 µg/m ³ not to be exceeded more than 18 times a year	1 Hour mean	31.12.2005
	40 µg/m ³	Annual Mean	
Nitrogen Oxides (for the protection of vegetation)	30 µg/m ³	Annual Mean	31.12.2000
Particles (PM ₁₀) (gravimetric)	50 µg/m ³ not to be exceeded more than 35 times a year	24 Hour Mean	31.12.2004
	40 µg/m ³	Annual Mean	31.12.2004
Particles (PM _{2.5}) Exposure Reduction	25 µg/m ³	Annual Mean	2020
Particles (PM _{2.5}) Exposure Reduction UK urban areas	Target of 15% reduction in concentrations at urban background ^a	Annual Mean	Between 2010 and 2020
Sulphur Dioxide	266 µg/m ³ not to be exceeded more than 35 times a year	15 Minute Mean	31.12.2005
	350 µg/m ³ not to be exceeded more than 24 times a year	1 Hour Mean	31.12.2004
	125 µg/m ³ not to be exceeded more than 3 times a year	24 Hour Mean	31.12.2004
Ozone	100 µg/m ³ not to be exceeded more than 10 times a year	8 Hour Mean	31.12.2005

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Table A3.1.2: EU limit values

Pollutant	EU Limit Value	Measured as	Date to be Achieved by and Maintained thereafter
Benzene	5 µg/m ³	Annual Mean	1 January 2010
Carbon Monoxide	10.0 mg/m ³	Maximum Daily 8-Hour Mean updated hourly	1 January 2005
Lead	0.5 µg/m ³	Annual Mean	1 January 2005
Nitrogen Dioxide	200 µg/m ³ not to be exceeded more than 18 times per year	1 Hour Mean	1 January 2010
	40 µg/m ³	Annual Mean	
Nitrogen Oxides (assuming as nitrogen dioxide)	30 µg/m ³ (for the protection of vegetation)	Annual Mean	19 July 2001
Ozone(Target)	120 µg/m ³ not to be exceeded more than 25 times per year	Maximum Daily Running 8-hour Mean updated hourly	1 January 2010
Particles (PM ₁₀) (gravimetric)	50 µg/m ³ not to be exceeded more than 35 times per year.	24 Hour Mean	1 January 2005
	40 µg/m ³	Annual Mean	1 January 2005
Particles (PM _{2.5}) Exposure Reduction UK except Scotland	Target value 25 µg/m ³	Annual Mean	2010
Particles (PM _{2.5}) Exposure Reduction UK urban areas	Target of 20% reduction in concentrations at urban background	Annual Mean	Between 2010 and 2020
Particles (PM _{2.5})	25 µg/m ³	Annual Mean	2015
	20 µg/m ³ ^a	Annual Mean	2020
Sulphur Dioxide	350 µg/m ³ not to be exceeded more than 24 times per year	1 Hour Mean	1 January 2005
	125 µg/m ³ not to be exceeded more than 3 times per year	24 Hour Mean	1 January 2005
	20 µg/m ³ (for the protection of vegetation)	Annual Mean	19 July 2001

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1.1.2 Traffic Data

Table A3.1.3: Traffic data used in the B1122 assessment of local air quality

Link Number	Link Name	2013 Base Year		Including Sizewell C Development				Excluding Sizewell C Development				Speed (km/h)
				2024 DM		2024 DS		2025 DM		2025 DS		
		AADT	HGV (%)	AADT	HGV (%)	AADT	HGV (%)	AADT	HGV (%)	AADT	HGV (%)	
1	A12 Junction /Middleton Road	2880	5	5306	14.8	5306	14.8	4032	5.4	4032	5.4	48
2	North of B1125/North option	2433	5	4777	15.8	0	0	3406	5.4			48
3	South of B1125	4293	5	6980	12.6	0	0	6011	5.4			48
4	South of Onner's Ln.	4963	5	7772	11.8	0	0	6948	5.4			48
5	Option A	0	0	0	0	4777	15.8	0	0	3406	5.4	48
6	Option B / Option C	0	0	0	0	6980	12.6	0	0	6011	5.4	48

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Table A3.1.4: Traffic data used in the D2 Route assessment of local air quality

Link Number	Link Name	2013 Base Year		Including Sizewell C Development				Excluding Sizewell C Development				Speed (km/h)
				2024 DM		2024 DS		2035 DM		2035 DS		
		AADT	HGV (%)	AADT	HGV (%)	AADT	HGV (%)	AADT	HGV (%)	AADT	HGV (%)	
7	B1121 (A12 to B1121)	2649	3.7	4442	2.6	177	3.7	3709	3.7	209	5	64
8	B1121 (B1121 to D2)	4731	2.8	6898	2.2	2642	2.8	6624	2.8	3124	5	64
9	B1121 (D2 to B1119)	4731	2.8	6898	2.2	7619	2.8	6624	2.8	9009	5	64
10	B1119 (B1121 to D2)	3008	5.3	5203	3.6	602	5.3	4212	5.3	711	5	64
11	B1119 (B1121 to Abbey Lane)	3008	5.3	5203	3.6	N/A	N/A	4212	5.3	N/A	N/A	64
12	Abbey Lane (B1119 to B1122)	531	0.9	2270	0.3	37	0.9	744	0.9	44	1	64
13	D2 Route -Between A12 and B1121	0	0	0	0	5345	14.2	0	0	3500	5	64
14	D2 Route - Between B1121 and B1119	0	0	0	0	5345	14.2	0	0	3500	5	64
15	D2 Route - B1119	0	0	0	0	5937	13.3	0	0	4200	5	64
16	D2 Route - SBetween B1119 and B1122	0	0	0	0	2976	20.3	0	0	700	1	64

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1.1.3 Model Verification

For any assessment it is necessary to consider and account for errors in the modelling process. Systematic errors in modelling results can arise from many factors, such as uncertainties in vehicle flows, speeds and the composition of the vehicle fleet. Such errors can be addressed and corrected for by making comparisons with monitoring data. The modelling results presented in this report were therefore verified by comparing model predictions against monitored pollutant concentrations in the study area and adjusting model predictions where necessary.

The accuracy of the future year modelling results is relative to the accuracy of the base year results, therefore greater confidence can be placed in the future year concentrations if good agreement is found for the base year.

Predicted annual average NO₂ concentrations were verified against monitored NO₂ data collected at the diffusion tube sites in the study area. The diffusion tubes located at Little Glenham 1 and Stratford St Andrew 4 were excluded from the adjustment factor calculations as these two sites had unusually low concentrations which would have lowered the adjustment factor and underpredicted concentrations at many locations. Excluding these two sites was a conservative assumption.

Initially the model was found to under-predict NO₂ concentrations at the diffusion tube monitoring sites. The model inputs were reviewed and with no reasonable refinements identified (such as reducing vehicle speeds or using different pollutant background concentrations, etc) two NO_x adjustment factors, one for receptors located within 50 m of the A12 between Stratford Saint Andrew and Farnham and one for all other receptors were calculated to adjust modelled road NO_x contributions. A higher adjustment factor was used for properties close to the A12 in Stratford St Andrew to represent the restricted dispersion due to terraced properties fronting the A12. Properties near the B1122 are not expected to have restricted dispersion so the general adjustment factor was used for all receptors.

After the adjustment of the modelled road NO_x contributions, the modelled NO₂ concentrations were found to be in good agreement with monitored NO₂ concentrations (i.e. within ±22%, excluding Little Glenham and Stratford St Andrew 4 due to their low results). A summary of the comparison between monitored NO₂ concentrations and modelled NO₂ results (adjusted and unadjusted) is shown in Appendix Air Quality, Table A3.1.4.

In the absence of local PM₁₀ monitoring data the adjustment factors determined for NO_x was also applied to modelled PM₁₀ concentrations.

Table A3.1 5: Summary of Model Verification

Site Name	2013 Annual Mean NO ₂ Concentration (µg/m ³)			
	Monitored	Modelled (Unadjusted)	Modelled (Adjusted)	Difference (Mod-Mon)
Receptors located within 50 m of A12 (between Stratford Saint Andrew and Farnham)				
Stratford St Andrew 1	40.0	17.0	40.0	0.0
Adjustment Factor (50 m A12)			4.717	
All other receptors				
Farnham 1	29.0	17.3	29.3	1
Farnham 2	31.0	17.4	29.4	-5
Stratford St Andrew 2	26.0	16.9	28.2	9
Stratford St Andrew 6	23.0	16.8	28.1	22
Stratford St Andrew 7	34.0	17.1	28.7	-15
Stratford St Andrew 4	16.0	17.3	26.4	65
Little Glenham	14.0	14.6	20.7	48
Adjustment Factor			2.753	

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1.1.5 Significance Criteria

- Interim Advice Note 174/13

Table A3.1.6 presents the different magnitude of change criteria for any annual average NO₂ and PM₁₀ concentrations, which is described as a percentage of the relevant air quality threshold.

Table A3.1.6: Magnitude of change criteria

Magnitude of Change in Concentration	Value of Change in Annual Average NO ₂ and PM ₁₀
Large (>4)	Greater than full Measure of Uncertainty (MoU) value of 10 % of the air quality objective (4µg/m ³).
Medium (>2 to 4)	Greater than half of the MoU (2µg/m ³), but less than the full MoU (4µg/m ³) of 10% of the air quality objective.
Small (>0.4 to 2)	More than 1% of objective (0.4µg/m ³) and less than half of the MoU i.e. 5% (2µg/m ³). The full MoU is 10% of the air quality objective (4µg/m ³).
Imperceptible (≤ 0.4)	Less than or equal to 1% of objective (0.4µg/m ³).

Only those receptors which exceed the air quality thresholds in either the without scheme scenario and/or with scheme scenario will be used to complete Table A3.1.7. Where the difference in concentrations are less than 0.4µg/m³ for annual average NO₂ (1% of the air quality threshold) then the change at these receptors is considered to be imperceptible and they can be scoped out of the judgement on significance. Receptors are then aggregated to calculate the total number of receptors in each category in Table A3.1.7.

Table A3.1.7: Local air quality receptors informing scheme significance

Magnitude of Change in Annual Average NO ₂ or PM ₁₀ (µg/m ³)	Total Number of Receptors with:	
	Worsening of air quality objective already above objective or creation of a new exceedance	Improvement of an air quality objective already above objective or the removal of an existing exceedance
Large (>4)		
Medium (>2 to 4)		
Small (>0.4 to 2)		

Where the outcomes of the assessment indicates that either all modelled concentrations are less than the air quality thresholds or any changes above the air quality thresholds but where the change is imperceptible, than the scheme effect is likely to be not significant for local air quality.

Changes that are greater than imperceptible should be compared to the guideline bands presented in Table A3.1.8.

Table A3.1.8: Guideline to number of properties constituting a significant effect

Magnitude of Change in Annual Average NO ₂	Number of Receptors with:	
	Worsening of air quality objective already above objective or creation of a new exceedance	Improvement of an air quality objective already above objective or the removal of an existing exceedance
Large (>4)	1 to 10	1 to 10
Medium (>2 to 4)	10 to 30	10 to 30
Small (>0.4 to 2)	30 to 60	30 to 60

The total number of receptors reported in Table A3.1.7 is compared with the guideline band. If the number of receptors is less than the lower guideline band in all the six magnitude categories, then a consideration of the overall direction of change should

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be provided. The outcome of the professional judgement of the scheme effects is likely to be not significant. This information should be used to inform overall significance.

Changes in concentrations which are greater than the upper guideline band in any of the magnitude categories are likely to be considered significant.

- Highways Agency's Guidance

Table A3.1.9: Proposed methodology to compile the air quality indicators (sourced from the Highways Agency's Guidance to evaluating significant air quality effects)

Box 1: Collating Information on Air Quality Indicators

1. Collate verified Do Minimum (without scheme) and Do Something (with scheme) concentrations in the assessment year for all receptors considered.
2. For any receptors with concentrations above the relevant air quality threshold, count the number of receptors with a large change (Do Something – Do Minimum), defined as greater than or equal to 5% of the threshold, noting those with improvements or deteriorations. Count the number of receptors (with concentrations above the threshold) with changes less than 5% of the threshold; i.e.
 - a. XX receptors experience a deterioration of more than 5% of the relevant threshold.
 - b. YY receptors experience an improvement of more than 5% of the relevant threshold.
 - c. ZZ receptors experience a change of less than 5% of the relevant threshold.
3. For receptors with concentrations over the relevant air quality threshold in either the Do Minimum or Do Something scenario, calculate frequency distribution of the change in concentration under the following ranges:
 - a. Improvements of more than 5% of the threshold.
 - b. Improvements of between 2.5% and 5% of the threshold.
 - c. Improvements of between 1% and 2.5% of the threshold.
 - d. Changes (both improvements and deteriorations) of less than 1% of the threshold.
 - e. Deteriorations of between 1% and 2.5% of the threshold.
 - f. Deteriorations of between 2.5% and 5% of the threshold.
 - g. Deteriorations of more than 5% of the threshold.
4. Based on rounding the modelled concentrations to the nearest whole number, count the number of receptors predicted to experience a deterioration, improvement or no change in air quality due to the scheme, i.e.
 - a. XX receptors above the thresholds experience a deterioration in air quality
 - b. YY receptors above the thresholds experience no change in air quality
 - c. ZZ receptors above the thresholds experience an improvement in air quality
5. Based on rounding the modelled concentrations to the nearest whole number, count the number of receptors where the scheme impact is predicted to create or remove an exceedance of the relevant air quality threshold (greater than, but not equal to) and the number of receptors where there is no change in the exceedance status, i.e. remains below / above threshold.
 - a. XX receptors experience a new exceedance of the threshold due to the scheme
 - b. YY receptors experience a removal of an exceedance of the threshold
 - c. ZZ receptors experience no change in exceedance, but were already in exceedance
6. Where 5a identifies a new exceedance of the threshold due to the scheme, comment whether these

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are clustered around existing exceedances (and therefore at least partially likely to be covered by existing AQAP measures) or whether they are in new areas of exceedance and new AQAP measures in pursuit of the thresholds may be required, i.e.

- a. XX receptors experiencing a new exceedance are adjacent to existing areas of exceedance
 - b. YY receptors experiencing a new exceedance are in new areas of exceedance
7. For receptors with concentrations over the relevant air quality threshold in either the Do Minimum or Do Something scenario, calculate using current forecasting approaches, the estimated reversibility duration of the scheme's impact, and calculate frequency distribution of the reversibility durations in the following ranges
- a. Less than 1 year
 - b. 1-3 years
 - c. 3-5 years
 - d. 5+ years

1.1.6 Mitigation Measures

Table A3.1.10: Dust and emission control measures

Activity	Control Measures for Medium Risk Site
Pre-site Preparation	Machinery, fuel and chemical storage and dust generating activities should not be located close to boundaries and sensitive receptors if at all possible. Erect solid barriers to site boundary.
Haul Routes	Use consolidated surfaces on roads near to residential areas. Hard surface all major haul routes through the site (e.g. use recycled rubber blocks, concrete blocks or tarmac). Regularly inspect haul routes for integrity and repair if required. When the haul route changes, re-use surface where possible.
Damping Down	Use agreed wet cleaning methods or mechanical road sweepers on all roads at least once a day or consider using fixed or mobile sprinkler systems. Provide hardstanding areas for vehicles and regularly inspect and clean these areas.
Vehicles	All vehicles should switch off engines - no idling. Clean or wash all vehicles effectively before they leave a site if there is a risk of affecting nearby sensitive receptors. Wheel wash vehicles before they leave a site. Hard surface haul routes and clean them effectively. Impose an appropriate speed limit around site.

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Activity	Control Measures for Medium Risk Site
Site entrances /Exits	<p>No extra control measures required if there are no nearby sensitive receptors.</p> <p>Wash or clean all vehicles effectively before leaving the site if it is close to sensitive receptors. Ideally there should be a paved area between the wheel wash and before the public road.</p> <p>Provide a control zone around the site boundary to protect sensitive receptors (this could include an area of hardstanding).</p> <p>Provide effective vehicle cleaning and specific wheel-washing facilities at all exits; with hose pipes, adequate water supply and pressure and mechanical wheel spinners or brushes.</p>
Mobile Crushing Plant	<p>This section only applies to construction sites that will operate mobile crushing plant at some point. This is an inherently dusty activity and will often be on sites normally classed as medium or high risk.</p> <p>Notify the local authority if a crusher is to be used as it has a duty to inspect the process. Mobile crushing plants are authorised as Part B processes, even if they are only temporary.</p> <p>Keep a copy of the permit on-site and adhere to the conditions therein at all times.</p> <p>Refer to Process Guidance not PG 3/16 (04) and use best available techniques (BAT) according to the guidance at all times.</p>
Concrete Batching	<p>As for mobile crushing plants, construction sites with concrete batching plants will often be categorised as medium or high risk.</p> <p>Developers following this guidance should treat such plant as authorised Part B processes, even if temporary, and employ the same level of best practice as indicated below. The local authority should be notified if a concrete batcher is to be used on site.</p> <p>Refer to Process Guidance note PG 3/1 (04) and carry out BAT.</p> <p>Wherever possible, these processes should be totally enclosed.</p>
Excavation and Earthworks	<p>All dusty activities should be damped down, especially during dry weather.</p> <p>Temporarily cover earthworks if possible.</p> <p>Minimise drop heights to control the fall of materials.</p> <p>Re-vegetate earthworks and other exposed areas to stabilise surfaces.</p> <p>Only remove secure covers in small areas during work and not all at once.</p> <p>Use hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil.</p>
Stock Piles and Storage Mounds	<p>Make sure that stockpiles exist for the shortest possible time.</p> <p>Do not build steep sided stockpiles or mounds or those that have sharp changes in shape.</p> <p>Whenever possible keep stockpiles or mounds away from the site boundary, sensitive receptors, watercourses and surface drains.</p> <p>Wherever possible, enclose stockpiles or keep them securely sheeted.</p>
Cutting, Grinding and Sawing	<p>All equipment should use water suppressant or suitable local exhaust ventilation systems.</p> <p>Use dust extraction techniques where available. All other equipment should be fitted with water suppressant systems.</p> <p>Use local exhaust ventilation.</p> <p>Service all fans and filters regularly to ensure they are properly maintained.</p>

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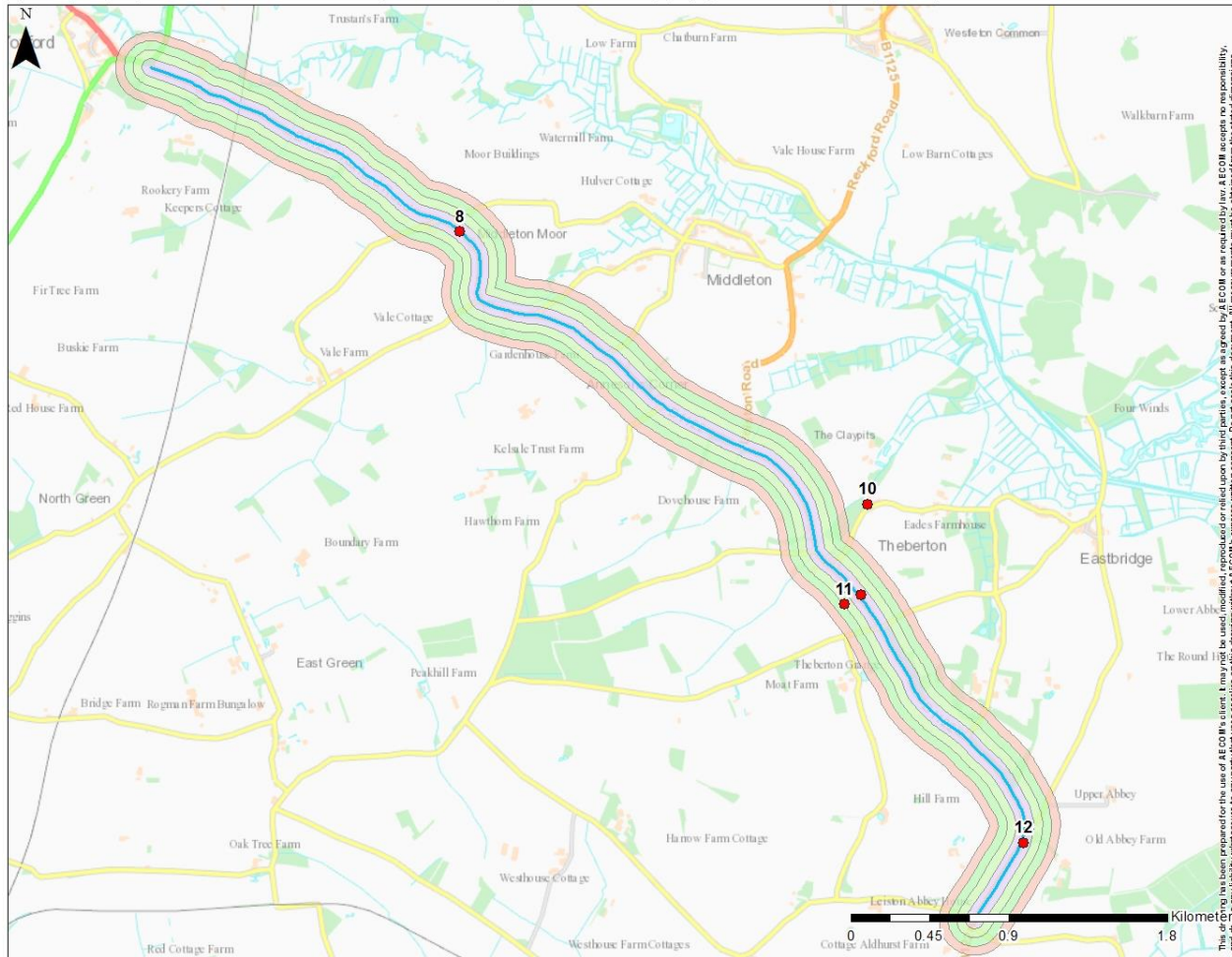
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Activity	Control Measures for Medium Risk Site
Chutes and Skips	<p>Securely cover skips.</p> <p>Minimise drop heights to control the fall of materials.</p> <p>Regularly damp down surfaces with water.</p>
Scabbling	Pre-wash work surfaces, screen of work areas and vacuum up all dusty residue rather than sweeping away.
Waste Disposal / Burning	<p>No burning of any material is permitted on site.</p> <p>All excess material should not be wasted, but used or safely removed from site according to appropriate legislation.</p>
Dealing with Spillages	<p>Use bunded areas wherever practicable.</p> <p>Regularly inspect the site area for spillages, have spillage kits readily available and clean spillages using agreed wet handling methods.</p> <p>Vacuum or sweep regularly to prevent the build up of fine waste dust material, which is spilled on the site and is designated as waste that is no longer fit for use should be dealt with in accordance with the Waste Management Licensing Regulations (WMLR), 1994.</p> <p>Inform the Environment Agency, London Fire and Emergency Planning Authority (LFEPA) or the Health Protection Agency (HPA) if harmful substances are spilled.</p>
Demolition Activities	Any asbestos must be dealt with by a registered contractor at all times and removed according to appropriate regulations and approved codes of practice/HSE guidance such as HSG248 and MDHS100.
Hazardous or Contaminated Materials	Under the Control of Substances Hazardous to Health (COSHH) Regulations, 2002, developers must ensure that they take into account risks to the workforce from exposure to any harmful substances generated by work activities. Emphasis should be placed on preventing or reducing emissions at source and where this is not possible personal protective equipment may be appropriate.
Sand, Grit and Shot Blasting	Uses agreed wet processes, sheet areas to contain dust and use silica-free material.
Planing and Sanding	Use fans and/or filters, dust suppression techniques and water sprays.
Fitting Out	<p>Fit all machinery for activities such as plastering, sanding or rendering with dust suppression/collection equipment.</p> <p>Vacuum all waste material.</p>
Welding and Soldering	Follow control measures in HSE guidance notes EH54 and EH55.
Tarmac Laying and Use of Bitumen	<p>Do not overheat bitumen and cover pots.</p> <p>Use great care in all processes to prevent spillages and extinguish any accidental fires immediately.</p>

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Figure 3.1.6: WebTag Distance Bands for the DM scenario – Existing B1122

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B1122 AND D2 SIZEWELL

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LEGEND

- Sensitive Receptors
- Existing B1122
- 50 metres
- 100 metres
- 150 metres
- 200 metres

KEY PLAN
Ipswich

PROJECT NUMBER
60315689
WebTag Distance Bands for DM Scenario

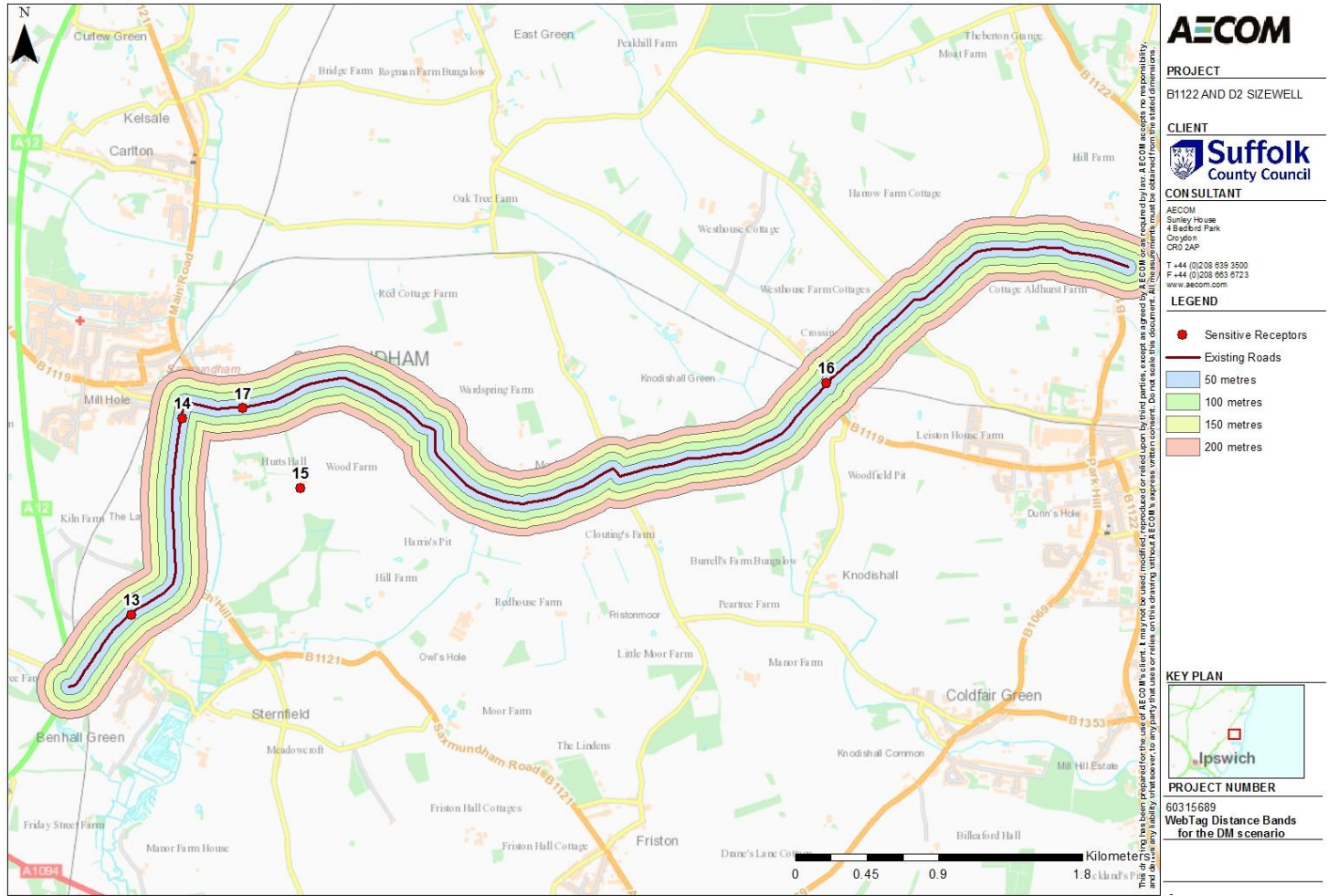
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Figure 3.1.7: WebTag Distance Bands for the DM scenario – Existing D2 Route

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Appendix 1.3

Planning Policy

Capabilities on project:
Environment

Appendix 1.3 – Planning Policy

Multiple planning policies and planning legislations apply to this scheme. A summary of these policies can be seen below in Table A10.

Table A10:

Designation	Brief Description
National Planning Policy Framework (NPPF) (2012)	<p>Section 11 is concerned with conserving and enhancing the natural environment and states that the planning system should achieve this by <i>“minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity”</i>. When determining planning applications, it states that local planning authorities should aim to conserve and enhance biodiversity and to refuse planning permission <i>“if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for”</i> with regard to any protection afforded to sites, habitats and species.</p> <p>Section 118, states that <i>“planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.”</i></p> <p>Planning and mitigation should recognise the wider benefits of ecosystem services and establishment of ecological networks to build in an element of resilience for our native species and habitats. Opportunities to enhance biodiversity are also encouraged.</p> <p>Section 119, states that <i>“the presumption in favour of sustainable development (paragraph 14) does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined.”</i></p>
Suffolk Core Strategy (2013)	<p>The Core Strategy and Development Management Policies document was formally adopted by the Council on 5 July 2013 and re-titled the <i>Suffolk Coastal District Local Plan - Core Strategy and Development Management Policies</i>. The most relevant policy is:</p> <p>Strategic Policy SP14 – Biodiversity and Geodiversity</p> <p>Biodiversity and geodiversity will be protected and enhanced using a framework based on a network of:</p> <ul style="list-style-type: none"> • Designated sites; • Wildlife corridors and links; • The rivers, estuaries and coast; • Identified habitats and geodiversity features; • Landscape character areas; and • Protected species. <p>Sites of European importance, which include Special Areas of Conservation and Special Protection Areas are statutorily protected under the Conservation of Habitats and Species Regulations 2012 (based on EU directives), and wetlands of global importance (Ramsar sites) are protected by Government policy to apply the same level of protection as to European sites.</p> <p>More generally, the policy approach to development on sites designated for their biodiversity or geodiversity interest is set out in Policy DM27.</p> <p>The Suffolk Biodiversity Action Plan and Suffolk Local Geodiversity Action Plan will be implemented. The Strategy will also be to contribute to county targets through the restoration, creation and on-going management of new priority habitats as identified in those documents.</p>

Capabilities on project:
Environment

Designation	Brief Description
The UK Biodiversity Action Plan	<p>Biodiversity encompasses the whole variety of life on earth. It includes the whole of the natural world from the commonplace to the critically endangered. However, the world is losing biodiversity at an ever-increasing rate as a result of human activity. In 1992, the global community responded to biodiversity loss by publishing the Convention on Biological Diversity. Error! Reference source not found. below summarises the legislative background to the UK BAP, which is the UK's framework to meet its responsibilities under the Convention on Biological Diversity.</p> <p>The UK's responsibilities in relation to the Convention on Biological Diversity are given a framework in the form of the UK BAP.</p> <p>The NERC Act increases the legislative impetus behind BAPs by requiring the relevant authorities to '<i>have regard</i>' to the species and habitats listed.</p> <p>Section 40(1) of the NERC Act states every public body, including local planning authorities, must '<i>have regard</i>' for conserving biodiversity.</p> <p>Under Section 41, the Secretary of State must compile and publish a list of species and habitats that are '<i>are of principal importance for the purpose of conserving biodiversity</i>'.</p> <p>In 2008, the S41 List was published to fulfil the Secretary of State's duty under Section 41 of the NERC Act. The S41 List is the same as the current UK BAP List.</p>
Suffolk Biodiversity Action Plan	<p>The Suffolk BAP contains a long list of priority habitats and species. The ones most relevant to the Study Area are listed below:</p> <ul style="list-style-type: none"> • <i>Bufo bufo</i> Common toad • <i>Triturus cristatus</i> Great Crested newt • <i>Zootoca vivipara</i> Common lizard • <i>Natrix natrix</i> Grass snake • <i>Anguis fragilis</i> Slow-worm • <i>Tyto alba</i>* Barn owl* • <i>Pyrrhula pyrrhula</i> Bullfinch • <i>Prunella modularis</i> Hedge accentor (Dunnock) • <i>Sturnus vulgaris</i> Common starling • <i>Passer domesticus</i> House sparrow • <i>Turdus philomelos</i> Song thrush • <i>Muscicapa striata</i> Spotted flycatcher • <i>Limosa limosa</i> Black-tailed godwit • <i>Dendrocopos minor</i> Lesser spotted woodpecker • <i>Passer montanus</i> Eurasian tree sparrow • <i>Perdix perdix</i> Grey partridge • <i>Motacilla flava</i> Yellow wagtail • <i>Vanellus vanellus</i> Northern Lapwing • <i>Streptopelia turtur</i> Turtle dove • <i>Carduelis cannabina</i> Linnnet • <i>Alauda arvensis</i> Skylark

Capabilities on project:
Environment

Designation	Brief Description
	<ul style="list-style-type: none"> • <i>Emeriza citronella</i> Yellowhammer • <i>Lepus europaeus</i> Brown hare • <i>Lutra lutra</i> European otter • <i>Micromys minutus</i> Harvest mouse • <i>Arvicola terrestris</i> Water vole • <i>Neomys fodiens*</i> Water shrew* • <i>Erinaceus europaeus</i> West European hedgehog • <i>Anguilla anguilla</i> European eel • <i>Lampetra fluviatilis</i> River lamprey • <i>Plecotus auritus</i> Brown long-eared bat • <i>Nyctalus noctula</i> Noctule bat • <i>Pipistrellus pygmaeus</i> Soprano pipistrelle bat • Arable field margins • Coastal and floodplain grazing marsh (inc. dykes) • Lowland mixed deciduous woodland • Ponds • Rivers

Appendix 1.4

WebTAG Biodiversity Impacts Worksheet

Capabilities on project:
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Appendix 1.4– WebTAG Biodiversity Impacts Worksheet

Table A1: List of Status Abbreviations used in the WebTAG Tables Below

Abbreviation	Definition
BA	Protection of Badgers Act
Bern	The Bern Convention of Migratory Species of Wild Animals
Bonn	Bonn Convention on Conservation of Migratory Species of Wild Animals
BDir22	EC Birds Directive
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EPS	European Protected Species
HDir	EU Habitat and Species Directive
LBAP	Suffolk Biodiversity Action Plan
UKBAP	UK Biodiversity Action Plan Priority
WCA1.1	Wildlife and Countryside Act 1981 Schedule 1 Part 1
WCA5	Wildlife and Countryside Act 1981 Schedule 5
WCA9	Wildlife and Countryside Act 1981 Schedule 9
UKBAm (RSPB)	RSPB UK Amber Listed Birds (not based in IUCN Criteria)
WBAm (RSPB)	RSPB Welsh Amber Listed Birds (not based on IUCN criteria)
WBR (RSPB)	RSPB Welsh Red Listed Birds (not based on IUCN criteria)
UKBR (RSPB)	RSPB UK Red Listed Birds (not based on IUCN criteria)
S42	National Environment and Rural Communities Act 2006 Section 42
RD2	Red Data Book (not based on IUCN criteria) e.g. nationally scarce and nationally rare
LI (BIS)	Locally Important as Specified by Local Experts

Capabilities on project:
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Colour Coding

For Clarity, the WebTag tables below are colour coded, both by route option and assessment score of link upon receptor. Please see below for an explanation of the colour scheme.

Table A2: Route Colour Scheme

Routing	Colour Scheme
Route A	
Theberton Bypass East (Band D)	
Theberton Bypass West (Route C and D)	
Route D2	

Table A3: Assessment of Impact of Route upon Receptor

Impact	Colour Scheme
Neutral	
Slight Adverse	
Moderate Adverse	
Large Adverse	
Very Large Adverse	

Capabilities on project:

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Table A4: Option A WebTAG Table

Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Westleton Heath NNR 4215.6m	<p>Star species: Birds of open heath and light scrub are well represented here and include tree pipit, Dartford warbler, stonechat and nightjar; while the woodlands support nightingale and woodcock.</p> <p>The local flora is typical of acid soil, with species such as harebell, tormentil, heath bedstraw and mossy tilia on the grassheath. Cross-leaved heath may also be found in the damper areas. Of the heather species, common heather and ling predominate, and these, together with deep purple bell heather, provide an important nectar source for invertebrates such as the white admiral butterfly.</p> <p>Other invertebrates found here include rare solitary bees and wasps, the striped-winged grasshopper and glow-worms.</p> <p>Management of the heath involves the rotational burning of heather. Six different heather blocks are burnt at ages varying between seven and 20 years. This creates a mixture of age structures which are beneficial to wildlife: short heather with bare ground is colonised by the rare silver-studded blue butterfly, while older heather supports rare beetles and spiders.</p> <p>Firebreaks limit the damage from accidental fires and provide areas of bare ground beneficial to burrowing bees and wasps.¹</p>	National	High Westleton Heath NNR is part of the best remaining tract of heathland in Suffolk.	Likely Stable Individual areas mostly favourable or unfavourable but recovering ²	High	None	Neutral	Neutral

¹ [Available Online, Accessed 22/04/2014] <http://www.naturalengland.org.uk/ourwork/conservation/designations/nnr/1006157.aspx>

² [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Minsmere-Walberswick RAMSAR 2276.2m	<p>This composite, Suffolk coastal site contains a complex mosaic of habitats, notably, areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle and driftline, woodland and areas of lowland heath. The site supports the largest continuous stand of reed in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats create an exceptional area of scientific interest supporting nationally scarce plants, British Red Data Book invertebrates and nationally important numbers of breeding and wintering birds.</p> <p>Ramsar criterion 1</p> <p>The site contains a mosaic of marine, freshwater, marshland and associated habitats complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.</p> <p>Ramsar criterion 2³</p>	International	<p>This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i>, <i>Anas strepera</i>, <i>Anas crecca</i>, <i>Anas clypeata</i>, <i>Circus aeruginosus</i>, <i>Recurvirostra avosetta</i>, <i>Panurus biarmicus</i></p>	Likely Stable Individual areas mostly favourable or unfavourable but recovering ⁴	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

³ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/pdf/RIS/UK11044.pdf>

⁴ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Minsmere to Walberswick Heaths & Marshes SAC 2184.4m	This site is one of two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type. Species include those typical of sandy shores, such as sea sandwort <i>Honckenya peploides</i> and shingle plants such as sea beet <i>Beta vulgaris</i> ssp. <i>maritima</i> . 4030 European dry heaths. Lowland European dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly NVC type H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> heath, usually more characteristic of western parts of the UK. This type is dominated by heather <i>Calluna vulgaris</i> , western gorse <i>Ulex gallii</i> and bell heather <i>Erica cinerea</i> . ⁵⁶	International	Large tracts of RSPB managed reedbeds and this site is one of only two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type.	Likely Stable Individual areas mostly favourable or unfavourable but recovering ⁷	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

⁵ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012809>

⁶ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK0012809-Minsmere-to-Walberswick-Heaths-and-Marshes-SAC_tcm6-31798.pdf

⁷ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Dew's Ponds SAC 3838.1m	<p>Site contains multiple habitat types:</p> <ul style="list-style-type: none"> - Inland water bodies (Standing water, Running water) (4%) - Improved grassland (85%) - Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas) (10%) - Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites) (1%) <p>This site in rural East Suffolk comprises a series of 12 ponds set in an area of formerly predominantly arable land. The ponds range from old field ponds created for agricultural purposes to some constructed in recent years specifically for wildlife. Some of the land has been converted from arable to grassland, with a variety of grassland types present; other habitats include hedges and ditches. Great crested newts <i>Triturus cristatus</i> have been found in all ponds on site.^{8 9}</p>	International	A connected network of ponds designated for their importance to GCN.	Unknown Ponds are increasing on a regional scale ¹⁰ However, likely declining nationally due to agricultural drainage succession and development and the presence of fish. ¹¹	Very High	None	Neutral	Neutral

⁸ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0030133>

⁹ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK0030133-Dews-Ponds-SAC_tcm6-31817.pdf

¹⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2008.asp?X=%7B137E07AE-58A8-4256-9B10-9F5B7A390015%7D&C=3&flipLang=&txtLogout=

¹¹ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0030133>

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Minsmere-Walberswick SPA 2276.2m	Minsmere – Walberswick is located on the Suffolk coast south of Southwold in eastern England. It comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle, woodland and areas of lowland heath. It supports the largest continuous stand of Common Reed <i>Phragmites australis</i> in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. There are nationally important numbers of breeding and wintering birds. In particular, the reedbeds are of major importance for breeding Bittern <i>Botaurus stellaris</i> and Marsh Harrier <i>Circus aeruginosus</i> . A range of breeding waders (e.g. Avocets <i>Recurvirostra avosetta</i>) and heathland birds occur in other areas of the SPA. The shingle beaches support important numbers of breeding Little Tern <i>Sterna albifrons</i> , which feed substantially outside the SPA in adjacent marine waters. The site is also important for wintering Bitterns and raptors. ^{12 13}	International	This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i> , <i>Anas strepera</i> , <i>Anas crecca</i> , <i>Anas clypeata</i> , <i>Circus aeruginosus</i> , <i>Recurvirostra avosetta</i> , <i>Panurus biarmicus</i> ¹⁴	Likely Stable Individual areas mostly favourable or unfavourable but recovering ¹⁵	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹² [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/default.aspx?page=2009>

¹³ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

¹⁴ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

¹⁵ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situt_id=1009440

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Minsmere-Walberswick Heaths and Marshes SSSI 1752.0m	This composite site is situated on the coast of Suffolk between Southwold in the north and Sizewell in the south. It contains a complex series of habitats, notably mudflats, shingle beach, reedbeds, heathland and grazing marsh, which combine to create an area of exceptional scientific interest. ¹⁶	National	UKBAP Suffolk BAP ¹⁷ http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000721.pdf The composite of habitat types it supports and its associated fauna are of national importance	Mostly favourable or unfavourable but recovering ¹⁸	High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse
Sizewell Marshes SSSI 1774.0m	Sizewell Marshes occupies a low-laying basin of deep fen peat. The water table is permanently high, with the area being prone to flooding, and there is an extensive network of ditches across the site. ¹⁹	National	Important for its large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds. Several nationally scarce plants are also present.	Stable - Favourable ²⁰	High	Pollution of the wetland system indirectly from construction and operational runoff.	Minor negative	Slight Adverse

¹⁶ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000721.pdf

¹⁷ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000721.pdf

¹⁸ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

¹⁹ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003416.pdf

²⁰ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/Special/sssi/unitlist.cfm?sssi_id=1003416

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Leiston Beck and Minsmere Old River Major Tributary 1 0.0m	Extending existing culvert For detail please see the Water Chapter tributary to the Leiston Beck and Minsmere Old River in the area. Mostly low flow at the time of survey. Obviously rapid flow through during heavy rain as erosion was noted. Occasional in water vegetation such as water cress was noted.	Local/Regional	Provides a variety of ecosystem services including biodiversity, flood attenuation. River may support both directly and indirectly a large range of valuable species, especially birds and fish. UK and Suffolk BAP ²¹	Unknown ²²	Medium	Potential habitat loss and fragmentation in works area due to extended culverting along riverside during construction and operation Increased pollution (deposition/runoff and silting) during construction and operation Disturbance from noise and lighting during construction and operation.	Minor Negative	Slight Adverse

²¹ [Available Online, Accessed 22/04/2014]

http://maps.environmentagency.gov.uk/wiyby/wiybyController?latest=true&topic=wfd_rivers&ep=query&lang=en&x=640261.75125&y=268830.06299999997&scale=7&layerGroups=1&queryWindowWidth=25&queryWindowHeight=25

²² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Leiston Beck and Minsmere Old River Major Tributary 2 0.0m	Extending existing culvert For detail please see the Water Chapter tributary to the Leiston Beck and Minsmere Old River in the area. Mostly low flow at the time of survey. Obviously rapid flow through during heavy rain as erosion was noted. Occasional in water vegetation such as water cress was noted.	Local/Regional	Provides a variety of ecosystem services including biodiversity, flood attenuation. River may support both directly and indirectly a large range of valuable species, especially birds and fish. UK and Suffolk BAP ²³	Unknown ²⁴	Medium	Potential habitat loss and fragmentation in works area due to extended culverting along riverside during construction and operation Increased pollution (deposition/runoff and silting) during construction and operation Disturbance from noise and lighting during construction and operation.	Minor Negative	Slight Adverse

²³ [Available Online, Accessed 22/04/2014]

http://maps.environmentagency.gov.uk/wiyby/wiybyController?latest=true&topic=wfd_rivers&ep=query&lang=en&x=640261.75125&y=268830.06299999997&scale=7&layerGroups=1&queryWindowWidth=25&queryWindowHeight=25

²⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
New Plantation deciduous Woodland 0.0m	Small plantation deciduous woodland to the south of the existing B1122 bisected at the northern end by the proposed route where it diverts from the existing B1122.	Local	UK and Suffolk BAP ²⁵ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²⁶	Low	Habitat loss and fragmentation	Major negative	Moderate Adverse
Long Covert 445 m south-west of the road at the northern end	Broad-leaved woodland , likely to be plantation situated between two small non-arable fields, immediately to the west of the railway line, attached to a thin strip of woodland/tree line running alongside the railway.	Local	UK and Suffolk BAP ²⁷ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²⁸	Low	None	Neutral	Neutral

²⁵ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²⁷ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Kelsale Covert 365m south-west of the road at the northern end	Broad-leaved woodland likely to be plantation adjacent to arable fields, immediately to the east of the railway, attached to a thin strip of woodland/tree line running alongside the railway.	Local	UK and Suffolk BAP ²⁹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ³⁰	Low	None	Neutral	Neutral
Half Moon Covert 325m south of the road	Mixed woodland, surrounded by arable fields, with an area of immature plantation woodland adjacent to the south.	Local	UK and Suffolk BAP ³¹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ³²	Low	None	Neutral	Neutral

²⁹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

³⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

³¹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

³² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
The Widow's Cruse 385m north of the road	Broad-leaved woodland perhaps wet woodland, adjacent to grazing marsh and arable fields, bordering the River Minsmere New Cut to the south and surrounding a tributary or ditch of the river to the north of the existing B1122	Local	UK and Suffolk BAP ³³ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ³⁴	Low	None	Neutral	Neutral
Coastal and Floodplain Grazing Marsh 48.9m	Coastal and Floodplain Grazing Marsh BAP habitat to the north of the existing B1122 in the floodplain of the Minsmere River.	Regional	UKBAP Suffolk BAP Medium	Increasing ³⁵	Medium	None	Neutral	Neutral
Purple Moor-grass and Rush Pastures 56.4m	Part of the Coastal and Floodplain Grazing Marsh BAP habitat to the north of the existing B1122 in the floodplain of the Minsmere River.	Regional	Medium	Increasing ³⁶	Medium	None	Neutral	Neutral
Habitats General								

³³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

³⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

³⁵ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7BE7D29822-8D7F-4798-9731-8262D355DB51%7D&C=3&txtLogout=&flipLang=

³⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7BE7D29822-8D7F-4798-9731-8262D355DB51%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Woodlands (unnamed)	<p>The agricultural landscape is dotted with small pockets of mature semi-natural broadleaved and mixed woodland, copses and old plantation shelter belts – not named. These have well formed canopies including common elm and ash with occasional scots pine and larch and understories of hawthorn and elder with ground layers of violet, primrose, nettle, lords and ladies, lesser celandine, alexanders, false oat grass and false brome amongst others.</p> <p>There are nine areas of unnamed woodland and small woodland pockets within 500m of the proposed route. Five of these are to the north of the road and two are to the south, mostly plantation woodlands. One area of immature plantation woodland to the north of Fordley Road is directly bisected by the proposed route. Two small areas both lie 40m from the proposed route, one to the south of Littlemoor Road and one near where the road re-joins the B1122.</p>	Local	UK and Suffolk BAP ³⁷ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ³⁸	Low	Indirect Fragmentation from each other Potentially deterioration in air quality during construction and operation	Minor Negative	Slight adverse

³⁷ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

³⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Hedgerows	<p>Three noted hedgerows are directly affected by the proposed route. One hedgerow lies either side of Littlemoor Road and is bisected where the road crosses. Another lies either side of the B1122 and will be directly affected by the works where the route diverges from the B1122. The third hedgerow lies either side of Fordley Road and will be directly affected by the works where the road rejoins the B1122 in the south, and is bisected where a spur extends from the road to join Fordley Road. A fourth hedgerow not accessed during the site survey would also be fragmented.</p> <p>The hedgerows are species rich with a mixture of blackthorn, hawthorn, elder, common elm, hornbeam, dog rose, ash, field maple, sycamore, understorey including stitchwort, lords and ladies, primrose, lesser celendine and other shade tolerant herbs.</p>	Local/Regional	<p>UK and Suffolk BAP³⁹</p> <p>Provide a wide range of ecosystem services; including connectivity, are botanically rich and the soils have been under shade for hundreds of years.</p> <p>Especially important as corridors for commuting species including bats.</p>	Fluctuating - probably increasing / improving ⁴⁰	Medium	<p>Habitat loss deposition</p> <p>Direct fragmentation</p> <p>Pollution (deposition/runoff)</p> <p>Disturbance from noise and lighting during construction and operation.</p>	Intermediate negative	Moderate Adverse

³⁹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁴⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B39331CD6-CDC5-43FD-BC15-3DA13567940D%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Small tributaries and ditches (unnamed)	Small tributaries to the Leiston Beck and Minsmere Old River in the area. Mostly low flow at the time of survey. Obviously rapid flow through during heavy rain as erosion was noted. Occasional in water vegetation such as water cress was noted.	Local	Provide important local flood attenuation. Impacts upon these features can have downstream impact upon rivers and estuaries. Can support a range of protected and valued faunal species including otters and water voles.	Unknown ⁴¹ Likely Declining due to agricultural run off, culverting etc	Low	Direct habitat loss from culverting from construction and operation. Damage / destruction to ditch through construction works. Indirect pollution from run off into culverts and discharges	Minor Negative	Slight Adverse

⁴¹ [Available Online, Accessed 22/04/2014]

http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals.asp?C=3&X=%7BA840CF0D%2DBD81%2D4D44%2D87AB%2D594DBAD57F55%7D

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Ponds	There are a at least four small ponds to the north of the existing road and and at least 7 to the south of the road these waterbodies were often shaded with minimal macrophytes not all accessible. These ponds ae connected tothe wider area via networks of hedgerows.	Local/Regional	UK and Suffolk BAP ⁴² Add heterogeneity to the landscape and provide habitat for aquatic macro fauna (other biodiversity benefits will be discussed within the faunal sections)	Increasing on a regional scale ⁴³ However , likely declining nationally due to agricultural drainage succession and development	Medium	Main potential impact is indirect, resulting from fragmentation of ponds from each other and the wider community	Intermediate Negative	Moderate Adverse

⁴² [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁴³ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2008.asp?X=%7B137E07AE-58A8-4256-9B10-9F5B7A390015%7D&C=3&flipLang=&txtLogout=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Arable fields	Much of the landscape surrounding the routing was under arable cultivation.	Local	As a buffer between hedgerows, woodlands and waterbodies this habitat provides a relatively undisturbed background to more valuable habitats. Probably under this landuse for hundreds of years. Can support valuable fauna and flora including bird species.	Unknown ⁴⁴ Likely declining due to development	Low	Habitat Loss due to road construction increased pollution deposition and run off.	Minor Negative	Neutral
Valued Faunal Receptors								
Badger	The majority of woodlands and hedgerow embankments were suitable for setting and the agricultural landscape offers excellent foraging habitat. There are badger records within 500m of the route option.	Local (but un-surveyed)	Badgers will use the wooded areas and drainage ditches for setting and the agricultural landscape for foraging and commuting. This species is legally protected by the Protection of badgers Act 1992 ⁴⁵	Unknown, likely increasing	Low	Small amounts of foraging habitat loss, RTAs	Minor Negative	Slight Adverse

⁴⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2005.asp?X=%7B5364AEF4-6D6B-4DBE-B308-41E002E6F87C%7D&C=3&flipLang=&txtLogout=

⁴⁵ [Available Online, Accessed 22/04/2014] <http://www.legislation.gov.uk/ukpga/1992/51/contents>

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Nesting birds	The majority of woodlands and hedgerow embankments were suitable for nesting birds such as blue tit, tree sparrow, blackbird, corvids and other woodland species. The improved and semi-improved grasslands were suitable for ground nesting birds such as sky lark. There is a record of Hen Harrier within 500m of the proposed works, and the area would have suitable barn owl nesting and foraging habitat.	Local (but un-surveyed)	WCA, WCA1 and BOCC Many still common species are under decline throughout the country due to habitat loss and noise pollution.	Varies dependent upon species	High	Disturbance and increased RTAs, loss of foraging and nesting areas	Minor Negative	Slight Adverse
Bats	The majority of woodlands and hedgerow embankments were suitable for foraging and commuting bats. The farmland buildings and mature trees are likely to be suitable for roosting. Pipistrelle and brown long-eared bat are recorded within the area.	Local (but un-surveyed)	EPS, HDir, WCA5, S42, Bonn, Bern, LBAP Many still common but declining due to habitat loss, common pipistrelle recovering UKBAP Suffolk BAP ⁴⁶	Varies dependent upon species	Vary dependent upon species (can be high)	Disturbance and increased RTAs, loss of commuting route and foraging areas.	Minor Negative	Slight Adverse
GCN	There were multiple waterbodies including ponds and ditches within the route corridor and these have potential to support breeding habitat for GCN. There is suitable connecting terrestrial habitat in the form of hedgerows and narrow field margins. There are records of GCN within 500m of the proposed route.	Local/Regional depending on pond numbers	EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP	Declining ⁴⁷	Medium	Fragmentation of habitat. Loss of terrestrial habitat	Intermediate negative	Moderate adverse
Common Reptiles	The field margins, riparian corridors and hedgerows in the works area had the potential to support common reptiles.	Local (but un-surveyed)	WCA5, S42, UKBAP, Bern, LBAP	Declining ⁴⁸	Low	Loss of habitat, disturbance	Minor Negative	Slight Adverse

⁴⁶ [Available Online, Accessed 22/04/2014] http://www.suffolkbiodiversity.org/content/suffolkbiodiversity.org/PDFs/action-plans/Suffolk%20Grouped%20Bat%20Action%20Plan%20final%20%202027_03_12.pdf

⁴⁷ [Available Online, Accessed 22/04/2014] <http://www.wildlifetrust.org.uk/urban/ecorecord/bap/html/gcnewt.htm>

⁴⁸ [Available Online, Accessed 22/04/2014] <http://www.bto.org/volunteer-surveys/gbw/gardens-wildlife/garden-reptiles-amphibians/status-britain>

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of impact	Magnitude of impact	Assessment score
Otter	There are records of otter on the Minsmere River and tributary, the main rivers in the area have the potential to support holts and lying up areas the route would require increasing the length of the existing culvert to the north of gardenhouse Farm and creating a new culvert	Local/Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, CITES, Suffolk BAP	Increasing ⁴⁹⁵⁰	Medium	Disturbance, effects from pollution and habitat loss.	Minor Negative	Slight Adverse
Water Vole	There are records of water vole in the area and many of the water courses showed the potential to support water vole	Local/ Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP	Declining ⁵¹	Medium	Potential fragmentation of habitat and habitat loss	Minor Negative	Slight Adverse

Reference Source(s): WebTAG unit A3 environmental impact appraisal, Department for Transport, October 2013

⁴⁹ Fifth Otter Survey of England, Environment Agency, 2010

⁵⁰ SOE State of the Environment (Anglia), Environment Agency 2010)

⁵¹ [Available Online, Accessed 22/04/2014] http://jncc.defra.gov.uk/_speciespages/115.pdf

Capabilities on project:

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Summary assessment score: SLIGHT ADVERSE

Qualitative comments:

The majority of assessed impacts upon valued receptors resulting from Route A were slight adverse. A few impacts, fragmentation and habitat loss upon predominantly hedgerows, woodlands ponds and riverine features were assessed as being moderate adverse. Overall the scheme was assessed as being slight adverse.

Qualitative comments:

The illustrative alignment for Route A does not bisect internationally designated sites. Internationally designated sites are present within 5km of the routing, although the closest of these within 2km and 2 SSSIs are within 2km Sizewell Marshes Minsmere-Walberswick Heaths and Marshes and they are hydrologically linked to the drainage systems in the areas therefore all though it is considered unlikely there is a small chance that these designated sites would be adversely impacted by Route A as proposed, Minsmere Levels CWS could also be indirectly affected via drainage systems.

from the proposed works they are hydrologically linked to the drainage systems in the areas therefore all though it is considered unlikely there is a small chance that these designated sites would be adversely impacted by Route A as proposed, Minsmere Levels CWS could be indirectly affected via drainage systems.

Habitat loss and fragmentation of hedgerows and woodlands and fragmentation of ponds are the key effects. With regards to valued fauna, the routing is likely to affect a number of species and groups. The woodlands in the vicinity of the routing are likely to support badgers and nesting birds, and common reptiles are likely to be present within any field or woodland edge habitats. A number of ponds are present in the vicinity of the routing, therefore the potential presence of GCN must be considered, and any pond fragmentation effects addressed. Great crested newt populations are present in the area, Dew's Ponds site is designated for this species.

Capabilities on project:

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Table A5: Option Theberton Bypass East (B+D) WebTAG

Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Coastal and Floodplain Grazing Marsh 234.0m	Coastal and Floodplain Grazing Marsh associated with the River Minsmere lies to the east of the routing.	Regional	Listed on Suffolk BAP ⁵² Environmentally Sensitive Areas (2008) Provides a variety of ecosystem services including biodiversity, grazing, flood attenuation. Can contain a range of habitats which support multiple valuable and protected species, including water vole and common reptiles. ⁵³	Increasing ⁵⁴	Medium	None	Neutral	Neutral

⁵² [Available Online, Accessed 22/04/2014] SUFFOLK PRIORITY SPECIES AND HABITATS (Suffolk Biodiversity Action Plan) January 2014

⁵³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/content/suffolkbiodiversity.org/PDFs/action-plans/grazingmarsh.pdf>

⁵⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7BE7D29822-8D7F-4798-9731-8262D355DB51%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Westleton Heath NNR 3388.0m	<p>Westleton Heath NNR is part of the best remaining tract of heathland in Suffolk.</p> <p>Star species: Birds of open heath and light scrub are well represented here and include tree pipit, dartford warbler, stonechat and nightjar; while the woodlands support nightingale and woodcock. The local flora is typical of acid soil, with species such as harebell, tormentil, heath bedstraw and mossy tilia on the grassheath. Cross-leaved heath may also be found in the damper areas. Of the heather species, common heather and ling predominate, and these, together with deep purple bell heather, provide an important nectar source for invertebrates such as the white admiral butterfly.</p> <p>Other invertebrates found here include rare solitary bees and wasps, the striped-winged grasshopper and glow-worms.</p> <p>Management of the heath involves the rotational burning of heather. Six different heather blocks are burnt at ages varying between seven and 20 years. This creates a mixture of age structures which are beneficial to wildlife: short heather with bare ground is colonised by the rare silver-studded blue butterfly, while older heather supports rare beetles and spiders.</p> <p>Firebreaks limit the damage from accidental fires and provide areas of bare ground beneficial to burrowing bees and wasps.⁵⁵</p>	National	<p>Rare Habitat</p> <p>Only about 20% of Sussex of the heathland remains, the rest has been lost to modern farming and forestry.</p>	Increasing ⁵⁶	High	None	Neutral	Neutral

⁵⁵ <http://www.naturalengland.org.uk/ourwork/conservation/designations/nnr/1006157.aspx>

⁵⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B830BBA17-BE3F-4C7B-993F-D8625DD5D516%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick RAMSAR 1044.2	This composite, Suffolk coastal site contains a complex mosaic of habitats, notably, areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle and driftline, woodland and areas of lowland heath. The site supports the largest continuous stand of reed in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats create an exceptional area of scientific interest supporting nationally scarce plants, British Red Data Book invertebrates and nationally important numbers of breeding and wintering birds. ⁵⁷	International	This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i> , <i>Anas strepera</i> , <i>Anas crecca</i> , <i>Anas clypeata</i> , <i>Circus aeruginosus</i> , <i>Recurvirostra avosetta</i> , <i>Panurus biarmicus</i>	Stable	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

⁵⁷ <http://jncc.defra.gov.uk/pdf/RIS/UK11044.pdf>

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere to Walberswick Heaths & Marshes SAC 1028.7m	<p>This site is one of two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type. Species include those typical of sandy shores, such as sea sandwort <i>Honckenya peploides</i> and shingle plants such as sea beet <i>Beta vulgaris</i> ssp. <i>maritima</i>. 4030 European dry heaths.</p> <p>Lowland European dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly NVC type H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> heath, usually more characteristic of western parts of the UK. This type is dominated by heather <i>Calluna vulgaris</i>, western gorse <i>Ulex gallii</i> and bell heather <i>Erica cinerea</i>.⁵⁸⁵⁹</p>	International	Large tracts of RSPB managed reedbeds and this site is one of only two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type.	Likely Stable Individual areas mostly favourable or unfavourable but recovering ⁶⁰	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

⁵⁸ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012809>

⁵⁹ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK0012809-Minsmere-to-Walberswick-Heaths-and-Marshes-SAC_tcm6-31798.pdf

⁶⁰ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick SPA 1044.2m	Minsmere – Walberswick is located on the Suffolk coast south of Southwold in eastern England. It comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mud-flats, lagoons, shingle, woodland and areas of lowland heath. It supports the largest continuous stand of Common Reed <i>Phragmites australis</i> in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. There are nationally important numbers of breeding and wintering birds. In particular, the reedbeds are of major importance for breeding Bittern <i>Botaurus stellaris</i> and Marsh Harrier <i>Circus aeruginosus</i> . A range of breeding waders (e.g. Avocets <i>Recurvirostra avosetta</i>) and heathland birds occur in other areas of the SPA. The shingle beaches support important numbers of breeding Little Tern <i>Sterna albifrons</i> , which feed substantially outside the SPA in adjacent marine waters. The site is also important for wintering Bitterns and raptors. ^{61 62}	International	This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i> , <i>Anas strepera</i> , <i>Anas crecca</i> , <i>Anas clypeata</i> , <i>Circus aeruginosus</i> , <i>Recurvirostra avosetta</i> , <i>Panurus biarmicus</i> ⁶³	Likely Stable Individual areas mostly favourable or unfavourable but recovering ⁶⁴	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

⁶¹ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/default.aspx?page=2009>

⁶² [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

⁶³ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

⁶⁴ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Sandlings SPA 2664.7m	The Sandlings SPA lies near the Suffolk coast between the Deben Estuary and Leiston. In the 19th century, the area was dominated by heathland developed on glacial sandy soils. During the 20th century, large areas of heath were planted with blocks of commercial conifer forest and others were converted to arable agriculture. Lack of traditional management has resulted in the remnant areas of heath which have survived successional changes and the consequent spread of bracken <i>Pteridium aquilinum</i> , shrubs and trees. The recent conservation management work, however, is resulting in their restoration. The heaths support both acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation value. Woodlark <i>Lullula arborea</i> and Nightjar <i>Caprimulgus europaeus</i> have also adapted to breeding in the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground. ⁶⁵	International	Nightjar <i>Caprimulgus europaeus</i> , 109 pairs representing at least 3.2% of the breeding population in Great Britain (Count as at 1992) Woodlark <i>Lullula arborea</i> , 154 pairs representing at least 10.3% of the breeding population in Great Britain (Count as at 1997) ⁶⁶	Declining due to bracken Invasion however remedial activities/management of bracken will ensure stability ⁶⁷	Very High	Indirect pollution from construction and operation	Minor negative	Slight Adverse

⁶⁵ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9020286-Sandlings-SPA_tcm6-32228.pdf

[Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/page-2084-theme=default>

⁶⁶ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9020286-Sandlings-SPA_tcm6-32228.pdf

⁶⁷ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/page-2084-theme=default>

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick Heaths and Marshes SSSI CWS 423.9m	This composite site is situated on the coast of Suffolk between Southwold in the north and Sizewell in the south. It contains a complex series of habitats, notably mudflats, shingle beach, reedbeds, heathland and grazing marsh, which combine to create an area of exceptional scientific interest. ⁶⁸	National	UKBAP Suffolk BAP ⁶⁹	Mostly favourable or unfavourable but recovering ⁷⁰	High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse
Sizewell Marshes SSSI 1074.0m	Sizewell Marshes occupies a low-laying basin of deep fen peat. The water table is permanently high, with the area being prone to flooding, and there is an extensive network of ditches across the site. ⁷¹	National	Important for its large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds. Several nationally scarce plants are also present.	Stable - Favourable ⁷²	High	Pollution of the wetland system indirectly from construction and operational runoff.	Minor negative	Slight Adverse

⁶⁸ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000721.pdf

⁶⁹ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000721.pdf

⁷⁰ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sss/unit_details.cfm?situnt_id=1009440

⁷¹ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003416.pdf

⁷² [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/Special/sss/unitlist.cfm?sssi_id=1003416

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Yewtree Corner 0m adjacent to the south of the road	Strip of mixed plantation woodland to the south of the B1122, bordering an arable field and attached in the west to Plumtreehills Covert.	Local	UK and Suffolk BAP ⁷³ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁷⁴	Low	Direct damage and loss from construction, additional noise and disturbance Pollution effects from operation of road. Reduction in air quality / pollution, primarily from operation.	Minor Negative	Slight Adverse

⁷³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁷⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Leiston Beck and Minsmere Old River Major Tributary 3 0.0m	Extending existing culvert For detail please see the Water Chapter tributary to the Leiston Beck and Minsmere Old River in the area. Mostly low flow at the time of survey. Obviously rapid flow through during heavy rain as erosion was noted. Occasional in water vegetation such as water cress was noted.	Local/Regional	Provides a variety of ecosystem services including biodiversity, flood attenuation. River may support both directly and indirectly a large range of valuable species, especially birds and fish. UK and Suffolk BAP ⁷⁵	Unknown ⁷⁶	Medium	Potential habitat loss and fragmentation in works area due to extended culverting along riverside during construction and operation Increased pollution (deposition/runoff and silting) during construction and operation Disturbance from noise and lighting during construction and operation.	Minor Negative	Slight Adverse

⁷⁵ [Available Online, Accessed 22/04/2014]

http://maps.environmentagency.gov.uk/wiyby/wiybyController?latest=true&topic=wfd_rivers&ep=query&lang=en&x=640261.75125&y=268830.0629999997&scale=7&layerGroups=1&queryWindowWidth=25&queryWindowHeight=25

⁷⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Plumtree hills Covert 150m	Mixed woodland shelterbelt bordering mixed use farmland, attached in the north to Yewtree Corner. Woodland is adjacent to the south of the road routing.	Local	UK and Suffolk BAP ⁷⁷ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁷⁸	Low	Likely to be unaffected	Neutral	Neutral
The Claypits 150m	Area of mixed and immature plantation woodland, bordered by arable fields. Lies to the north of the routing.	Local	UK and Suffolk BAP ⁷⁹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁸⁰	Low	Likely to be unaffected	Neutral	Neutral

⁷⁷ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁷⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

⁷⁹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁸⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Rattla Corner 0m	Area of mixed plantation woodland situated between a tributary of the Minsmere River system and Church Road. This area will be bisected by the proposed route option.	Regional	UK and Suffolk BAP ⁸¹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁸²	Medium	Direct damage fragmentation and habitat loss from construction. Pollution effects from operation of road. Reduction in air quality / pollution, primarily from operation.	Major Negative	Moderate Adverse
Mill Grove 45m	Area of mixed woodland surrounded by arable fields. Woodland lies to the the east of the routing.	Local	UK and Suffolk BAP ⁸³ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁸⁴	Medium	Likely to be unaffected	Neutral	Neutral

⁸¹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁸² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

⁸³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁸⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Grange Wood 390m to the west of the road	Mixed plantation woodland, bordered by arable fields.	Local	UK and Suffolk BAP ⁸⁵ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁸⁶	Medium	Likely to be unaffected	Neutral	Neutral

⁸⁵ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁸⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Brown's Fishpond Grove/Greenhouse Plantation 0m Complex	Mixed plantation woodland running alongside the B1122, continuous with Fishpond Grove and Greenhouse Plantation to the south. Lies adjacent to the road to the east of the routing.	Regional	UK and Suffolk BAP ⁸⁷ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁸⁸	Medium	Widening would cause habitat loss to the western edge of the wood that currently runs along the road Direct damage and loss from construction. Pollution effects from operation of road. Reduction in air quality / pollution, primarily from operation.	Intermediate Negative	Moderate Adverse

⁸⁷ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁸⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Leiston Beck and Minsmere Old River Major Tributary 4 0.0m	New culvert For detail please see the Water Chapter and TN 6, tributary to the Leiston Beck and Minsmere Old River in the area. Mostly low flow at the time of survey. Obviously rapid flow through during heavy rain as erosion was noted. Occasional in water vegetation such as water cress was noted.	Local/ Regional	Provides a variety of ecosystem services including biodiversity, flood attenuation. River may support both directly and indirectly a large range of valuable species, especially birds and fish. UK and Suffolk BAP ⁸⁹	Unknown ⁹⁰	Medium	Potential habitat loss and fragmentation in works area along riverside due to a new crossing of the watercourse during construction and operation Increased pollution (deposition/runoff and silting) during construction and operation Disturbance from noise and lighting during construction and operation.	Intermediate Negative	Moderate Adverse

⁸⁹ [Available Online, Accessed 22/04/2014]

http://maps.environmentagency.gov.uk/wiyby/wiybyController?latest=true&topic=wfd_rivers&ep=query&lang=en&x=640261.75125&y=268830.0629999997&scale=7&layerGroups=1&queryWindowWidth=25&queryWindowHeight=25

⁹⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Game Plantation 250m	Mixed plantation woodland to the north and west of Theberton House.	Local	UK and Suffolk BAP ⁹¹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁹²	Low	Likely to be unaffected	Neutral	Neutral
Old Abbey Farm 100m south of the southern end of the route	Mixed woodland, bordering mixed-use farmland.	Regional	UK and Suffolk BAP ⁹³ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁹⁴	Medium	Likely to be unaffected	Neutral	Neutral

⁹¹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁹² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

⁹³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁹⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Leiston Old Abbey 410m south-east of the southern end of the route	Mixed woodland, bordering mixed-use farmland.	Regional	UK and Suffolk BAP ⁹⁵ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁹⁶	Medium	Likely to be unaffected	Neutral	Neutral
Broom Covert 335m north of the road	Mixed woodland, bordering arable farmland and improved grazed fields.	Local	UK and Suffolk BAP ⁹⁷ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ⁹⁸	Medium	Likely to be unaffected	Neutral	Neutral
Habitats General								

⁹⁵ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁹⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

⁹⁷ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

⁹⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Woodlands (unnamed)	<p>The agricultural landscape is dotted with small pockets of mature semi-natural broadleaved and mixed woodland, copses and old plantation shelter belts – not named. These have well formed canopies including common elm and ash with occasional scots pine and larch and understories of hawthorn and elder with ground layers of violet, primrose, nettle, lords and ladies, lesser celandine, alexanders, false oat grass and false brome amongst others</p> <p>There are fourteen areas of unnamed woodland and small copses within 500m of the proposed route. Seven are located to the south and seven to the north, and the closest lies 85m to the west of the The hedgerows are species rich with a mixture of blackthorn, hawthorn, elder, common elm, hornbeam, dog rose, ash, field maple, sycamore, understorey including stitchwort, lords and ladies, primrose, lesser celendine and other shade tolerant herbsroad. None are directly affected by the proposed works.</p>	Regional	<p>UK and Suffolk BAP⁹⁹</p> <p>Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.</p>	Increasing ¹⁰⁰	Medium	Mostly none but some fragmentation from each other	Minor negative	Slight Adverse

⁹⁹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁰⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Hedgerows	<p>Two noted hedgerows, which lie either side of the B1122 will be directly affected by the proposed works, at the point where the road re-joins the B1122 to the south of Theberton and at the southern end of the road.</p> <p>Multiple other hedgerows are present, some of which will be bisected by the proposed road route and others within the 500m route corridor.</p>	Local/Regional	<p>UK and Suffolk BAP¹⁰¹</p> <p>Provide a wide range of ecosystem services; including connectivity, are botanically rich and the soils have been under shade for hundreds of years.</p> <p>Especially important as corridors for commuting species including bats.</p>	Fluctuating - probably increasing / improving ¹⁰²	Lower/Medium	<p>Direct damage and loss from construction.</p> <p>Fragmentation effects and loss of commuting corridors for wildlife.</p> <p>Pollution effects from operation of road.</p>	Intermediate Negative	Moderate Adverse

¹⁰¹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁰² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B39331CD6-CDC5-43FD-BC15-3DA13567940D%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Small tributaries and ditches (unnamed)	There are other multiple tributaries and unnamed drainage ditches associated with the River Minsmere system and Minsmere-Walberswick heaths and marshes, to the east of the proposed route option. The majority of these are not directly affected by the proposed works. Two unnamed tributaries of the River Minsmere system are directly bisected by the proposed route, one at the northern end of the road and one at Theberton.	Local	Provide important local flood attenuation. Impacts upon these features can have downstream impact upon rivers and estuaries (i.e. the Alde Ore Estuary which is internationally designated). Can support a range of protected and valued faunal species including otters and water voles.	Unknown ¹⁰³ Likely Declining due to agricultural run off, culverting etc	Low	Direct habitat loss from culverting and pollution from construction and operation. Damage / destruction to ditch through construction works. Indirect pollution from run off into culverts and discharges	Minor negative	Slight Adverse

¹⁰³ [Available Online, Accessed 22/04/2014]

http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals.asp?C=3&X=%7BA840CF0D%2DBD81%2D4D44%2D87AB%2D594DBAD57F55%7D

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Ponds	There are nineteen ponds within 500m of the proposed route. Twelve are to the west and seven are to the east of the route. The closest is adjacent to the B112 within Brown's Plantation and is likely to be directly affected by widening works.	Regional	Add heterogeneity to the landscape and provide habitat for aquatic macro fauna (other biodiversity benefits will be discussed within the faunal sections)	Increasing on a regional scale ¹⁰⁴ However, likely declining nationally due to agricultural drainage succession and development	Medium	Main potential impact is indirect, resulting from fragmentation of ponds from each other and the wider community	Intermediate Negative	Moderate Adverse
Arable fields	Much of the landscape surrounding the routing was under arable cultivation.	Local	As a buffer between hedgerows, woodlands and waterbodies this habitat provides a relatively undisturbed background to more valuable habitats. Probably under this landuse for hundreds of years. Can support valuable fauna and flora including bird species.	Unknown ¹⁰⁵ Likely declining due to development	Low	Habitat Loss due to road construction increased pollution deposition and runoff.	Minor Negative	Neutral
Valued Faunal Receptors								

¹⁰⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2008.asp?X=%7B137E07AE-58A8-4256-9B10-9F5B7A390015%7D&C=3&flipLang=&txtLogout=

¹⁰⁵ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2005.asp?X=%7B5364AEF4-6D6B-4DBE-B308-41E002E6F87C%7D&C=3&flipLang=&txtLogout=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Badger	The majority of woodlands and hedgerow embankments were suitable for setting and the agricultural landscape offers excellent foraging habitat. There are badger records within 500m of the proposed route.	Local (but un-surveyed)	Badgers will use the wooded areas and drainage ditches for setting and the agricultural landscape for foraging and commuting. This species is legally protected by the Protection of badgers Act 1992 ¹⁰⁶	Unknown, likely increasing	Low	Small amounts of foraging habitat loss, RTAs	Minor Negative	Slight Adverse
Nesting birds	The majority of woodlands and hedgerow embankments were suitable for nesting birds such as blue tit, tree sparrow, blackbird, corvids etc. The improved and semi-improved grasslands were suitable for ground nesting birds such as skylark. There is a record of barn owl close to Leiston Old Abbey (just outside 500m) and the area would provide suitable barn owl nesting and foraging habitat.	Local (but un-surveyed)	WCA, WCA1 and BOCC Many still common species are under decline throughout the country due to habitat loss and noise pollution.	Varies dependent upon species	Vary dependent upon species (can be high)	Disturbance and increased RTAs, loss of foraging and nesting areas	Minor Negative	Slight Adverse
Bats	The majority of woodlands and hedgerow embankments were suitable for foraging and commuting bats. The farmland buildings and mature trees around the routing are likely to be suitable for roosting. There are records of pipistrelle and brown long-eared bats in the area.	Local (but un-surveyed)	EPS, HDir, WCA5, S42, Bonn, Bern, LBAP Many still common but declining due to habitat loss, common pipistrelle recovering UKBAP Suffolk BAP ¹⁰⁷	Varies dependent upon species	Vary dependent upon species (can be high)	Disturbance and increased RTAs, loss of commuting route and foraging areas.	Minor Negative	Slight Adverse

¹⁰⁶ [Available Online, Accessed 22/04/2014] <http://www.legislation.gov.uk/ukpga/1992/51/contents>

¹⁰⁷ [Available Online, Accessed 22/04/2014] http://www.suffolkbiodiversity.org/content/suffolkbiodiversity.org/PDFs/action-plans/Suffolk%20Grouped%20Bat%20Action%20Plan%20final%20%202027_03_12.pdf

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
GCN	There were multiple waterbodies including ponds and ditches within the route corridor and these have potential to support breeding habitat for GCN. There is suitable connecting terrestrial habitat in the form of hedgerows and narrow field margins. There are records of GCN within 500m of the proposed route.	Local/Regional depending on pond numbers	EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP	Declining ¹⁰⁸	Medium	Fragmentation of habitat. Loss of terrestrial habitat	Intermediate negative	Moderate adverse
Common Reptiles	The field margins, riparian corridors and hedgerows have the potential to support common reptiles.	Local (but un-surveyed)	WCA5, S42, UKBAP, Bern, LBAP	Declining ¹⁰⁹	Low	Loss of habitat, disturbance	Minor Negative	Slight Adverse
Otter	The tributaries and watercourses associated with the River Minsmere system, and the riparian corridor provide suitable habitat for otters including couches and there are records in the area.	Local/Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, CITES, Suffolk BAP	Increasing ¹¹⁰¹¹¹	Medium	Disturbance, effects from pollution and habitat loss.	Minor Negative	Slight Adverse
Water Vole	Drainage ditches and tributaries and watercourses associated with the River Minsmere system provide suitable habitat for water voles and there are records in the area.	Local/Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP	Declining ¹¹²	Medium	Potential fragmentation of habitat and habitat loss	Minor Negative	Slight Adverse

Reference Source(s): WebTAG unit A3 environmental impact appraisal, Department for Transport, October 2013

¹⁰⁸ [Available Online, Accessed 22/04/2014] <http://www.wildlifetrust.org.uk/urban/ecorecord/bap/html/gcnewt.htm>¹⁰⁹ [Available Online, Accessed 22/04/2014] <http://www.bto.org/volunteer-surveys/gbw/gardens-wildlife/garden-reptiles-amphibians/status-britain>¹¹⁰ Fifth Otter Survey of England, Environment Agency, 2010¹¹¹ SOE State of the Environment (Anglia), Environment Agency 2010)¹¹² [Available Online, Accessed 22/04/2014] http://jncc.defra.gov.uk/_speciespages/115.pdf

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Summary assessment score: SLIGHT to MODERATE ADVERSE

The majority of assessed impacts upon valued receptors resulting from Theberton Bypass East (Routes B+D) were slight to moderate adverse. A few impacts, upon predominantly hedgerows and woodlands were assessed as being moderate adverse.

Qualitative comments:

The illustrative alignment for Route B+D does not bisect internationally designated sites. Internationally designated sites are present within 5km of the routing, although the closest of these is within 2km and 2 SSSIs are within 1km Sizewell Marshes Minsmere-Walberswick Heaths and Marshes and they are hydrologically linked to the drainage systems in the areas therefore all though it is considered unlikely there is a small chance that these designated sites would be adversely impacted by Route B+D as proposed, Minsmere Levels CWS could also be indirectly affected via drainage systems.

The illustrative alignment for Route B has the potential to affect a number of habitats. One tributary of the Old Minsmere River would require extended culverting and one a new culvert. There will be loss and fragmentation of woodland habitats Rattla corner and the Greenhouse/Fox Grove/Browns plantation complex and fragmentation of hedgerows and ponds. With regards to valued fauna, the routing is likely to affect a number of species and groups. The woodlands in the vicinity of the routing are likely to support badgers and nesting birds, and common reptiles are likely to be present within any field or woodland edge habitats. A number of ponds are present in the vicinity of the routing, therefore the potential presence of GCN must be considered, and any pond fragmentation effects addressed.

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Table A6: Option Theberton Bypass West (Route C and D) WebTAG Table

Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Coastal and Floodplain Grazing Marsh 320.2m	Coastal and Floodplain Grazing Marsh associated with the River Minsmere lies to the east of the routing.	Regional	Listed on Suffolk BAP ¹¹³ Environmentally Sensitive Areas (2008) Provides a variety of ecosystem services including biodiversity, grazing, flood attenuation. Can contain a range of habitats which support multiple valuable and protected species, including water vole and common reptiles. ¹¹⁴	Increasing ¹¹⁵	Medium	None	Neutral	Neutral

¹¹³ [Available Online, Accessed 22/04/2014] SUFFOLK PRIORITY SPECIES AND HABITATS (Suffolk Biodiversity Action Plan) January 2014

¹¹⁴ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/content/suffolkbiodiversity.org/PDFs/action-plans/grazingmarsh.pdf>

¹¹⁵ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7BE7D29822-8D7F-4798-9731-8262D355DB51%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Westleton Heath NNR 3672.6m	<p>Westleton Heath NNR is part of the best remaining tract of heathland in Suffolk.</p> <p>Star species: Birds of open heath and light scrub are well represented here and include tree pipit, dartford warbler, stonechat and nightjar; while the woodlands support nightingale and woodcock.</p> <p>The local flora is typical of acid soil, with species such as harebell, tormentil, heath bedstraw and mossy tiliaea on the grassheath. Cross-leaved heath may also be found in the damper areas. Of the heather species, common heather and ling predominate, and these, together with deep purple bell heather, provide an important nectar source for invertebrates such as the white admiral butterfly.</p> <p>Other invertebrates found here include rare solitary bees and wasps, the striped-winged grasshopper and glow-worms. Management of the heath involves the rotational burning of heather. Six different heather blocks are burnt at ages varying between seven and 20 years. This creates a mixture of age structures which are beneficial to wildlife: short heather with bare ground is colonised by the rare silver-studded blue butterfly, while older heather supports rare beetles and spiders.</p> <p>Firebreaks limit the damage from accidental fires and provide areas of bare ground beneficial to burrowing bees and wasps.¹¹⁶</p>	National	<p>Rare Habitat</p> <p>Only about 20% of Sussex of the heathland remains, the rest has been lost to modern farming and forestry.</p>	Increasing ¹¹⁷	High	None	Neutral	Neutral

¹¹⁶ <http://www.naturalengland.org.uk/ourwork/conservation/designations/nnr/1006157.aspx>

¹¹⁷ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B830BBA17-BE3F-4C7B-993F-D8625DD5D516%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick RAMSAR 1478.5m	This composite, Suffolk coastal site contains a complex mosaic of habitats, notably, areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle and driftline, woodland and areas of lowland heath. The site supports the largest continuous stand of reed in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats create an exceptional area of scientific interest supporting nationally scarce plants, British Red Data Book invertebrates and nationally important numbers of breeding and wintering birds. ¹¹⁸	International	This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i> , <i>Anas strepera</i> , <i>Anas crecca</i> , <i>Anas clypeata</i> , <i>Circus aeruginosus</i> , <i>Recurvirostra avosetta</i> , <i>Panurus biarmicus</i>	Stable ¹¹⁹	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹¹⁸ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/pdf/RIS/UK11044.pdf>

¹¹⁹ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/pdf/RIS/UK11044.pdf>

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere to Walberswick Heaths & Marshes SAC 1413.1m	<p>Annex I habitats that are a primary reason for selection of this site</p> <p>1210 Annual vegetation of drift lines This site is one of two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type. Species include those typical of sandy shores, such as sea sandwort <i>Honckenya peploides</i> and shingle plants such as sea beet <i>Beta vulgaris ssp. maritima</i>.</p> <p>4030 European dry heaths Lowland European dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly NVC type H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> heath, usually more characteristic of western parts of the UK. This type is dominated by heather <i>Calluna vulgaris</i>, western gorse <i>Ulex gallii</i> and bell heather <i>Erica cinerea</i>.</p> <p>http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012809 http://www.naturalengland.org.uk/Images/UK0012809-Minsmere-to-Walberswick-Heaths-and-Marshes-SAC_tcm6-31798.pdf</p>	International	Large tracts of RSPB managed reedbeds and this site is one of only two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type.	Likely Stable Individual areas mostly favourable or unfavourable but recovering ¹²⁰	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹²⁰ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick SPA 1478.5m	Minsmere – Walberswick is located on the Suffolk coast south of Southwold in eastern England. It comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mud-flats, lagoons, shingle, woodland and areas of lowland heath. It supports the largest continuous stand of Common Reed <i>Phragmites australis</i> in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. There are nationally important numbers of breeding and wintering birds. In particular, the reedbeds are of major importance for breeding Bittern <i>Botaurus stellaris</i> and Marsh Harrier <i>Circus aeruginosus</i> . A range of breeding waders (e.g. Avocets <i>Recurvirostra avosetta</i>) and heathland birds occur in other areas of the SPA. The shingle beaches support important numbers of breeding Little Tern <i>Sterna albigrons</i> , which feed substantially outside the SPA in adjacent marine waters. The site is also important for wintering Bitterns and raptors. ^{121 122}	International	This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i> , <i>Anas strepera</i> , <i>Anas crecca</i> , <i>Anas clypeata</i> , <i>Circus aeruginosus</i> , <i>Recurvirostra avosetta</i> , <i>Panurus biarmicus</i> ¹²³	Likely Stable Individual areas mostly favourable or unfavourable but recovering ¹²⁴	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹²¹ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/default.aspx?page=2009>

¹²² [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

¹²³ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

¹²⁴ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Sandlings SPA 3626.4m	The Sandlings SPA lies near the Suffolk coast between the Deben Estuary and Leiston. In the 19th century, the area was dominated by heathland developed on glacial sandy soils. During the 20th century, large areas of heath were planted with blocks of commercial conifer forest and others were converted to arable agriculture. Lack of traditional management has resulted in the remnant areas of heath which have survived successional changes and the consequent spread of bracken <i>Pteridium aquilinum</i> , shrubs and trees. The recent conservation management work, however, is resulting in their restoration. The heaths support both acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation value. Woodlark <i>Lullula arborea</i> and Nightjar <i>Caprimulgus europaeus</i> have also adapted to breeding in the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground. ¹²⁵	International	Nightjar <i>Caprimulgus europaeus</i> , 109 pairs representing at least 3.2% of the breeding population in Great Britain (Count as at 1992) Woodlark <i>Lullula arborea</i> , 154 pairs representing at least 10.3% of the breeding population in Great Britain (Count as at 1997) ¹²⁶	Declining due to bracken Invasion however remedial activities/management of bracken will ensure stability ¹²⁷	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹²⁵ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9020286-Sandlings-SPA_tcm6-32228.pdf

[Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/page-2084-theme=default>

¹²⁶ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9020286-Sandlings-SPA_tcm6-32228.pdf

¹²⁷ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/page-2084-theme=default>

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick Heaths and Marshes SSSI 742.0m	This composite site is situated on the coast of Suffolk between Southwold in the north and Sizewell in the south. It contains a complex series of habitats, notably mudflats, shingle beach, reedbeds, heathland and grazing marsh, which combine to create an area of exceptional scientific interest. ¹²⁸	National	UKBAP Suffolk BAP ¹²⁹	Mostly favourable or unfavourable but recovering ¹³⁰	High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse
Sizewell Marshes SSSI 1074.0m	Sizewell Marshes occupies a low-laying basin of deep fen peat. The water table is permanently high, with the area being prone to flooding, and there is an extensive network of ditches across the site. ¹³¹	National	Important for its large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds. Several nationally scarce plants are also present.	Stable - Favourable ¹³²	High	Pollution of the wetland system indirectly from construction and operational runoff.	Minor negative	Slight Adverse

¹²⁸ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000721.pdf

¹²⁹ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000721.pdf

¹³⁰ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

¹³¹ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003416.pdf

¹³² [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/Special/sssi/unitlist.cfm?sssi_id=1003416

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Plumtreehills Covert 0m	Mixed woodland shelterbelt bordering mixed use farmland, attached in the north to Yewtree Corner. Woodland is adjacent to the south of the road routing.	Local	UK and Suffolk BAP ¹³³ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹³⁴	Low	Habitat loss and fragmentation	Major negative	Moderate Adverse
Yewtree Corner 0m adjacent to the south of the road	Strip of mixed woodland to the south of the B1122, bordering an arable field and attached in the west to Plumtreehills Covert.	Local	UK and Suffolk BAP ¹³⁵ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹³⁶	Low	Habitat loss and fragmentation	Major negative	Moderate Adverse

¹³³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹³⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

¹³⁵ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹³⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Leiston Beck and Minsmere Old River Major Tributary 3 0.0m	New culvert For detail please see the Water Chapter, tributary to the Leiston Beck and Minsmere Old River in the area. Mostly low flow at the time of survey. Obviously rapid flow through during heavy rain as erosion was noted. Occasional in water vegetation such as water cress was noted.	Local/ Regional	Provides a variety of ecosystem services including biodiversity, flood attenuation. River may support both directly and indirectly a large range of valuable species, especially birds and fish. UK and Suffolk BAP ¹³⁷	Unknown ¹³⁸	Medium	Potential habitat loss and fragmentation in works area along riverside due to a new crossing of the watercourse during construction and operation Increased pollution (deposition/run off and silting) during construction and operation Disturbance from noise and lighting during construction and operation.	Intermediate Negative	Moderate Adverse

¹³⁷ [Available Online, Accessed 22/04/2014]

http://maps.environmentagency.gov.uk/wiyby/wiybyController?latest=true&topic=wfd_rivers&ep=query&lang=en&x=640261.75125&y=268830.06299999997&scale=7&layerGroups=1&queryWindowWidth=25&queryWindowHeight=25

¹³⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Old Abbey Farm 100m	Mixed woodland, bordering mixed-use farmland. Lies to the south of the southern end of the routing.	Local	UK and Suffolk BAP ¹³⁹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁴⁰	Low	None	Neutral	Neutral
Leiston Old Abbey 410m	Mixed woodland, bordering mixed-use farmland.. Lies south-east of the southern end of the routing.	Local	UK and Suffolk BAP ¹⁴¹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁴²	Low	None	Neutral	Neutral

¹³⁹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁴⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

¹⁴¹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁴² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Leiston Beck and Minsmere Old River Major Tributary 4 0.0m	New culvert For detail please see the Water Chapter and TN4, tributary to the Leiston Beck and Minsmere Old River in the area. Mostly low flow at the time of survey. Obviously rapid flow through during heavy rain as erosion was noted. Occasional in water vegetation such as water cress was noted.	Local/ Regional	Provides a variety of ecosystem services including biodiversity, flood attenuation. River may support both directly and indirectly a large range of valuable species, especially birds and fish. UK and Suffolk BAP ¹⁴³	Unknown ¹⁴⁴	Medium	Potential habitat loss and fragmentation in works area along riverside due to a new crossing of the watercourse during construction and operation Increased pollution (deposition/run off and silting) during construction and operation Disturbance from noise and lighting during construction and operation.	Intermediate Negative	Moderate Adverse

¹⁴³ [Available Online, Accessed 22/04/2014]

http://maps.environmentagency.gov.uk/wiyby/wiybyController?latest=true&topic=wfd_rivers&ep=query&lang=en&x=640261.75125&y=268830.06299999997&scale=7&layerGroups=1&queryWindowWidth=25&queryWindowHeight=25

¹⁴⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Brown's Fishpond Grove/Greenhouse Plantation 0m Complex	Mixed plantation woodland running alongside the B1122, continuous with Fishpond Grove and Greenhouse Plantation to the south. Lies adjacent to the road to the east of the routing.	Regional	UK and Suffolk BAP ¹⁴⁵ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁴⁶	Medium	Widening would cause habitat loss to the western edge of the wood that currently runs along the road Direct damage and loss from construction. Pollution effects from operation of road. Reduction in air quality / pollution, primarily from operation.	Intermediate Negative	Moderate Adverse

¹⁴⁵ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁴⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Broom Covert 335m	Mixed woodland, bordering arable farmland and improved grazed fields. Lies north of the road routing.	Local	UK and Suffolk BAP ¹⁴⁷ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁴⁸	Low	None	Neutral	Neutral
Triangle Wood 450m	Mixed woodland, bordering mixed-use farmland. Lies 450m to the north-west of the routing.	Local	UK and Suffolk BAP ¹⁴⁹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁵⁰	Low	None	Neutral	Neutral

¹⁴⁷ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁴⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

¹⁴⁹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁵⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Valley Farm Wood 150m	Mixed woodland, bordering mixed-use farmland. Lies 150m to the north of the routing	Local	UK and Suffolk BAP ¹⁵¹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁵²	Low	None	Neutral	Neutral
Dovehouse Farm wood 400m	Mixed woodland, bordering mixed-use farmland. Lies to the west of the routing.	Local	UK and Suffolk BAP ¹⁵³ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁵⁴	Low	None	Neutral	Neutral

¹⁵¹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁵² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

¹⁵³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁵⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Mill grove 400m	Mixed woodland, bordering mixed-use farmland. Lies to the west of the routing.	Local	UK and Suffolk BAP ¹⁵⁵ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁵⁶	Low	None	Neutral	Neutral
Old Rectory 200m	Mixed woodland, bordering mixed-use farmland. Lies to the west of the routing. Interconnected with sections of notable hedgerow to be affected by the works.	Local	UK and Suffolk BAP ¹⁵⁷ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁵⁸	Low	Fragmentation effects from impacts upon hedgerows. .	Intermediate	Slight Adverse

¹⁵⁵ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁵⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

¹⁵⁷ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁵⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Grange Wood 390m to the west of the road	Mixed plantation woodland, bordered by arable fields.	Local	UK and Suffolk BAP ¹⁵⁹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁶⁰	Medium	None	Neutral	Neutral
Game Plantation, Theberton Beds, Osier Beds woodland complex 250m	Mixed plantation woodland to the north and west of Theberton House. Lies to the east of the road.	Local	UK and Suffolk BAP ¹⁶¹ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ¹⁶²	Medium	None	Neutral	Neutral
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¹⁵⁹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁶⁰ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

¹⁶¹ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁶² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Woodlands (unnamed)	<p>The agricultural landscape is dotted with small pockets of mature semi-natural broadleaved and mixed woodland, copses and old plantation shelter belts – not named. These have well formed canopies including common elm and ash with occasional scots pine and larch and understories of hawthorn and elder with ground layers of violet, primrose, nettle, lords and ladies, lesser celandine, alexanders, false oat grass and false brome amongst others</p> <p>There are seventeen small areas of unnamed woodland within 500m of the proposed route. One is directly affected by the proposed works and a further two lie within 100m of the proposed routing.</p>	Regional	<p>UK and Suffolk BAP¹⁶³</p> <p>Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.</p> <p>However, unlike Ancient Woodland, this habitat is replaceable.</p>	Increasing ¹⁶⁴	Medium	<p>Direct impacts: Direct habitat loss and direct fragmentation of habitat.</p> <p>Increased pollution (deposition/run off) during construction and operation.</p> <p>Disturbance from noise and lighting during construction and operation.</p>	Intermediate Negative	Moderate Adverse

¹⁶³ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁶⁴ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Hedgerows	<p>The hedgerows are species rich with a mixture of blackthorn, hawthorn, elder, common elm, hornbeam, dog rose, ash, field maple, sycamore, understorey including lesser stitchwort, lords and ladies, primrose, lesser celendine and other shade tolerant herbs</p> <p>At least 6 hedgerows will be directly affected by the proposed works, they will be bisected or heavily impacted by the proposed works. A length of hedge row will need to be removed to facilitate the construction of the northern end of the routing.</p>	Local/Regional	<p>UK and Suffolk BAP¹⁶⁵</p> <p>Provide a wide range of ecosystem services; including connectivity, are botanically rich and the soils have been under shade for hundreds of years.</p> <p>Especially important as corridors for commuting species including bats.</p>	Fluctuating - probably increasing / improving ¹⁶⁶	Medium	<p>Direct damage and loss from construction.</p> <p>Fragmentation effects and loss of commuting corridors for wildlife.</p> <p>Pollution effects from operation of road.</p>	Intermediate Negative	Moderate Adverse

¹⁶⁵ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

¹⁶⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B39331CD6-CDC5-43FD-BC15-3DA13567940D%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Small tributaries and ditches (unnamed)	There are multiple tributaries and unnamed drainage ditches associated with the River Minsmere system and Minsmere-Walberswick heaths and marshes, to the east of the proposed route option. The majority of these are not directly affected by the proposed works. Two unnamed tributaries of the River Minsmere system are directly bisected by the proposed route, one at the northern end of the road and one at Theberton.	Local	Provide important local flood attenuation. Impacts upon these features can have downstream impact upon rivers and estuaries (i.e. the Alde Ore Estuary which is internationally designated) . Can support a range of protected and valued faunal species including otters and water voles.	Unknown ¹⁶⁷ Likely Declining due to agricultural run off, culverting etc	Lower	Direct pollution from construction and operation. Damage / destruction to ditch through construction works. Indirect pollution from run off into culverts and discharges	Intermediate Negative	Slight Adverse

¹⁶⁷ [Available Online, Accessed 22/04/2014]

http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals.asp?C=3&X=%7BA840CF0D%2DBD81%2D4D44%2D87AB%2D594DBAD57F55%7D

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Ponds	There are thirty two ponds within 500m of the proposed route. Twenty one are to the west and eleven are to the east of the route. The closest is 50m from the road. It is likely that three ponds will be directly impacted by the works.	Regional	Add heterogeneity to the landscape and provide habitat for aquatic macro fauna (other biodiversity benefits will be discussed within the faunal sections)	Increasing on a regional scale ¹⁶⁸ However, likely declining nationally due to agricultural drainage succession and development	Medium	Directly affected ponds: Direct loss of habitat. Increased pollution (deposition/run off) during construction and operation. Disturbance from noise and lighting during construction and operation. Indirect effects: Indirect fragmentation between ponds either side of the new road.	Intermediate Negative	Moderate Adverse

¹⁶⁸ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2008.asp?X=%7B137E07AE-58A8-4256-9B10-9F5B7A390015%7D&C=3&flipLang=&txtLogout=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Arable fields	Much of the landscape was under arable cultivation mostly oil seed rape	Local	As a buffer between hedgerows, woodlands and water bodies this habitat provides a relatively undisturbed background to more valuable habitats. Probably under this landuse for hundreds of years. Can support valuable fauna and flora including bird species.	Unknown ¹⁶⁹ Likely declining due to development	Low	Habitat Loss due to road construction increased pollution deposition and run off.	Minor Negative	Neutral
Valued Faunal Receptors								

¹⁶⁹ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2005.asp?X=%7B5364AEF4-6D6B-4DBE-B308-41E002E6F87C%7D&C=3&flipLang=&txtLogout=

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Badger	The majority of woodlands and hedgerow embankments were suitable for setting and the agricultural landscape offers excellent foraging habitat. There are badger records within 500m of the proposed route.	Local (but un-surveyed)	Badgers will use the wooded areas and drainage ditches for setting and the agricultural landscape for foraging and commuting. This species is legally protected by the Protection of badgers Act 1992 ¹⁷⁰	Unknown, likely increasing	Low	Small amounts of foraging habitat loss, RTAs	Minor Negative	Slight Adverse
Nesting birds	The majority of woodlands and hedgerow embankments were suitable for nesting birds such as blue tit, tree sparrow, blackbird, corvids etc. The improved and semi-improved grasslands were suitable for ground nesting birds such as skylark. There is a record of barn owl close to Leiston Old Abbey (just outside 500m) and the area would provide suitable barn owl nesting and foraging habitat.	Local (but un-surveyed)	WCA, WCA1 and BOCC Many still common species are under decline throughout the country due to habitat loss and noise pollution.	Varies dependant upon species	Vary dependent upon species (can be high)	Disturbance and increased RTAs, loss of foraging and nesting areas	Minor Negative	Slight Adverse

¹⁷⁰ [Available Online, Accessed 22/04/2014] <http://www.legislation.gov.uk/ukpga/1992/51/contents>

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Bats	The majority of woodlands and hedgerow embankments were suitable for foraging and commuting bats. The farmland buildings and mature trees around the routing are likely to be suitable for roosting. There are records of roosting bats in the area.	Local (but un-surveyed)	EPS, HDir, WCA5, S42, Bonn, Bern, LBAP Many still common but declining due to habitat loss, common pipistrelle recovering UKBAP Suffolk BAP ¹⁷¹	Varies dependant upon species	Vary dependent upon species (can be high)	Disturbance and increased RTAs, loss of commuting route and foraging areas.	Minor Negative	Slight Adverse
GCN	There were multiple waterbodies including ponds and ditches within the route corridor and these have potential to support breeding habitat for GCN. There is suitable connecting terrestrial habitat in the form of hedgerows and narrow field margins. There are records of GCN within 500m of the proposed route.	Local/Regional depending on pond numbers	EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP	Declining ¹⁷²	Medium	Fragmentation of habitat. Loss of terrestrial habitat	Intermediate negative	Moderate adverse
Common Reptiles	The field margins, riparian corridors and hedgerows have the potential to support common reptiles.	Local (but un-surveyed)	WCA5, S42, UKBAP, Bern, LBAP	Declining ¹⁷³	Low	Loss of habitat, disturbance	Minor Negative	Slight Adverse

¹⁷¹ [Available Online, Accessed 22/04/2014] http://www.suffolkbiodiversity.org/content/suffolkbiodiversity.org/PDFs/action-plans/Suffolk%20Grouped%20Bat%20Action%20Plan%20final%20%2027_03_12.pdf

¹⁷² [Available Online, Accessed 22/04/2014] <http://www.wildlifetrust.org.uk/urban/ecorecord/bap/html/gcnewt.htm>

¹⁷³ [Available Online, Accessed 22/04/2014] <http://www.bto.org/volunteer-surveys/gbw/gardens-wildlife/garden-reptiles-amphibians/status-britain>

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Step 2		Step 3		Step 4		Step 5		
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Otter	The tributaries and watercourses associated with the River Minsmere system, and the riparian corridor provide suitable habitat for otters. There are records of otter in the area	Local/Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, CITES, Suffolk BAP	Increasing ¹⁷⁴¹⁷⁵	Medium	Disturbance, effects from pollution and habitat loss.	Minor Negative	Slight Adverse
Water Vole	Drainage ditches and tributaries and watercourses associated with the River Minsmere system provide suitable habitat for water voles. There are records of water vole in the area.	Local/Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP	Declining ¹⁷⁶	Medium	Potential fragmentation of habitat and habitat loss	Minor Negative	Slight Adverse

Reference Source(s): WebTAG unit A3 environmental impact appraisal, Department for Transport, October 2013

Summary assessment score: Moderate Adverse

The majority of assessed impacts upon valued receptors resulting from Theberton Bypass West (Routes C+D) were moderate adverse due to impacts upon watercourses habitat loss and fragmentation of hedgerows, woodlands and numerous ponds were assessed as being moderate adverse.

Qualitative comments:

The illustrative alignment for Route C+D does not bisect internationally designated sites. Internationally designated sites are present within 5km of the routing, although the closest of these is within 2km from the proposed works and 2 SSSIs are within 1km Sizewell Marshes Minsmere-Walberswick Heaths and Marshes and they are hydrologically linked to the drainage systems in the areas therefore all though it is considered unlikely there is a small chance that these designated sites would be adversely impacted by Route B+D as proposed, Minsmere Levels CWS could also be indirectly affected via drainage systems.

The illustrative alignment for Route C+D has the potential to affect a number of habitats. Two tributaries of the Old Minsmere River would require new culverts. There will be loss and fragmentation of woodland habitats particularly Yew Tree corner and Plumtreehills Covert and the Greenhouse/Fox Grove/Browns plantation complex and fragmentation of hedgerows and ponds. With regards to valued fauna, the routing is likely to affect a number of species and groups. The woodlands in the vicinity of the routing are likely to support badgers and nesting birds, and common reptiles are likely to be present within any field or woodland edge habitats. A number of ponds are present in the vicinity of the routing, therefore the potential presence of GCN must be considered, and any pond fragmentation effects addressed.

¹⁷⁴ Fifth Otter Survey of England, Environment Agency, 2010

¹⁷⁵ SOE State of the Environment (Anglia), Environment Agency 2010)

¹⁷⁶ [Available Online, Accessed 22/04/2014] http://jncc.defra.gov.uk/_speciespages/115.pdf

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Table A7: Option D2 WebTAG Table

Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick RAMSAR 2549.5m	<p>This composite, Suffolk coastal site contains a complex mosaic of habitats, notably, areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle and driftline, woodland and areas of lowland heath. The site supports the largest continuous stand of reed in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats create an exceptional area of scientific interest supporting nationally scarce plants, British Red Data Book invertebrates and nationally important numbers of breeding and wintering birds.</p> <p>Ramsar criterion 1 The site contains a mosaic of marine, freshwater, marshland and associated habitats, complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.</p> <p>Ramsar criterion 2¹⁷⁷</p>	International	<p>This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including:</p> <p><i>Botaurus stellaris</i>, <i>Anas strepera</i>, <i>Anas crecca</i>, <i>Anas clypeata</i>, <i>Circus aeruginosus</i>, <i>Recurvirostra avosetta</i>, <i>Panurus biarmicus</i></p>	<p>Likely Stable</p> <p>Individual areas mostly favourable or unfavourable but recovering¹⁷⁸</p>	Very High	<p>Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries</p>	Minor negative	Slight Adverse

¹⁷⁷ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/pdf/RIS/UK11044.pdf>

¹⁷⁸ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Alde-Ore Estuary RAMSAR 4402.7m	An estuary complex of three rivers comprising various habitats including intertidal mudflats, saltmarsh, a vegetated shingle spit, saline lagoons, and semi-intensified grazing marsh. The site supports nationally scarce plants and invertebrates and notable assemblages of breeding and wintering wetland birds. ¹⁷⁹	International	International Designation (Ramsar, SAC) National Designation (SSSI) Important in the Anglian Region The site supports nationally scarce plants and invertebrates and notable assemblages of breeding and wintering wetland birds. ¹⁸⁰ "The second-largest and best-preserved example of vegetated shingle in Britain. A unique feature for East Anglian beaches is the abundance on the ground of normally epiphytic lichens." ¹⁸¹	Some parcels favourable some unfavourable A mixture of issues, disturbance, poor pest control, grazing (poaching), agriculture and vehicle damage, dredging, engineering works, pollution or bait digging, coastal squeeze. Being closely monitored though as a SSSI with appropriate management plans ¹⁸²	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹⁷⁹ [Available Online, Accessed 22/04/2014] http://www.ramsar.org/cda/en/ramsar-documents-list-anno-uk/main/ramsar/1-31-218%5E15868_4000_0__

¹⁸⁰ [Available Online, Accessed 22/04/2014] http://www.ramsar.org/cda/en/ramsar-documents-list-anno-uk/main/ramsar/1-31-218%5E15868_4000_0__

¹⁸¹ [Available Online, Accessed 22/04/2014] http://jncc.defra.gov.uk/Docs/UKBAP_BAPHabitats-10-CoastVegShingle.doc,

[Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/content/suffolkbiodiversity.org/PDFs/action-plans/coastalvegshingle.pdf>

¹⁸² [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1003208%20

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere to Walberswick Heaths & Marshes SAC 2530.2m	This site is one of two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type. Species include those typical of sandy shores, such as sea sandwort <i>Honckenia peploides</i> and shingle plants such as sea beet <i>Beta vulgaris</i> ssp. <i>maritima</i> . 4030 European dry heaths. Lowland European dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly NVC type H8 <i>Calluna vulgaris</i> – <i>Ulex gallii</i> heath, usually more characteristic of western parts of the UK. This type is dominated by heather <i>Calluna vulgaris</i> , western gorse <i>Ulex gallii</i> and bell heather <i>Erica cinerea</i> . ¹⁸³¹⁸⁴	International	Large tracts of RSPB managed reedbeds and this site is one of only two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type.	Likely Stable Individual areas mostly favourable or unfavourable but recovering ¹⁸⁵	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹⁸³ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012809>

¹⁸⁴ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK0012809-Minsmere-to-Walberswick-Heaths-and-Marshes-SAC_tcm6-31798.pdf

¹⁸⁵ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Alde-Ore & Butley Estuaries SAC 4402.7m	This estuary, made up of three rivers, is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north.	International	The SAC comprises extensive intertidal mudflats on both sides of the Alde River channel in its upper reaches and saltmarsh accreting along its fringes. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent. Supports a range of important habitats (and associated fauna). Habitats include but are not limited to : mudflats and sandflats; tidal rivers, estuaries. ¹⁸⁶	Some parcels favourable some unfavourable A mixture of issues, disturbance, poor pest control, grazing (poaching), agriculture and vehicle damage, dredging, engineering works, pollution or bait digging, coastal squeeze. Being closely monitored though as a SAC with appropriate management plan ¹⁸⁷	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹⁸⁶ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK0030076-Alde-Ore-and-Butley-Estuaries-SAC_tcm6-31816.pdf

¹⁸⁷ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1003208%20

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Alde-Ore & Butley Estuaries SAC 4402.7m	There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent throughout. The area is relatively natural, being largely undeveloped by man and with very limited industrial activity. The estuary contains large areas of shallow water over subtidal sediments, and extensive mudflats and saltmarshes exposed at low water. Its diverse and species-rich intertidal sand and mudflat biotopes grade naturally along many lengths of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed. http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0030076				Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Sandlings SPA 2241.9m	The Sandlings SPA lies near the Suffolk coast between the Deben Estuary and Leiston. In the 19th century, the area was dominated by heathland developed on glacial sandy soils. During the 20th century, large areas of heath were planted with blocks of commercial conifer forest and others were converted to arable agriculture. Lack of traditional management has resulted in the remnant areas of heath which have survived successional changes and the consequent spread of bracken <i>Pteridium aquilinum</i> , shrubs and trees. The recent conservation management work, however, is resulting in their restoration. The heaths support both acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation value. Woodlark <i>Lullula arborea</i> and Nightjar <i>Caprimulgus europaeus</i> have also adapted to breeding in the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground. ¹⁸⁸	International	Nightjar <i>Caprimulgus europaeus</i> , 109 pairs representing at least 3.2% of the breeding population in Great Britain (Count as at 1992) Woodlark <i>Lullula arborea</i> , 154 pairs representing at least 10.3% of the breeding population in Great Britain (Count as at 1997) ¹⁸⁹	Declining due to bracken Invasion however remedial activities/management of bracken will ensure stability ¹⁹⁰	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minmere river and associated tributaries	Minor negative	Slight Adverse

¹⁸⁸ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9020286-Sandlings-SPA_tcm6-32228.pdf

[Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/page-2084-theme=default>

¹⁸⁹ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9020286-Sandlings-SPA_tcm6-32228.pdf

¹⁹⁰ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/page-2084-theme=default>

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Minsmere-Walberswick SPA 2549.5m	Minsmere – Walberswick is located on the Suffolk coast south of Southwold in eastern England. It comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle, woodland and areas of lowland heath. It supports the largest continuous stand of Common Reed <i>Phragmites australis</i> in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. There are nationally important numbers of breeding and wintering birds. In particular, the reedbeds are of major importance for breeding Bittern <i>Botaurus stellaris</i> and Marsh Harrier <i>Circus aeruginosus</i> . A range of breeding waders (e.g. Avocets <i>Recurvirostra avosetta</i>) and heathland birds occur in other areas of the SPA. The shingle beaches support important numbers of breeding Little Tern <i>Sterna albifrons</i> , which feed substantially outside the SPA in adjacent marine waters. The site is also important for wintering Bitterns and raptors. ^{191 192}	International	This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc <i>Vertigo angustior</i> (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: <i>Botaurus stellaris</i> , <i>Anas strepera</i> , <i>Anas crecca</i> , <i>Anas clypeata</i> , <i>Circus aeruginosus</i> , <i>Recurvirostra avosetta</i> , <i>Panurus biarmicus</i> ¹⁹³	Likely Stable Individual areas mostly favourable or unfavourable but recovering ¹⁹⁴	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹⁹¹ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/default.aspx?page=2009>

¹⁹² [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Alde-Ore Estuary SPA 4402.7m	The Alde-Ore Estuary is located on the Suffolk coast in eastern England. It comprises the estuarine complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. There is a variety of habitats including intertidal mudflats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and semi-intensified grazing marsh. The Orfordness/Shingle Street land form is geomorphologically unique within the UK in combining a shingle spit with a cusped foreland. The diversity of wetland habitat types present is of particular significance to the birds occurring on the site as these provide a range of opportunities for feeding, roosting and nesting within the site complex. At different times of the year, the site supports notable assemblages of wetland birds including seabirds, wildfowl and waders.	International	<p>High</p> <p>During the breeding season site supports a number of important bird species including:</p> <ul style="list-style-type: none"> - Avocet <i>Recurvirostra avosetta</i>, 104 pairs representing at least 17.6% of the breeding population in Great Britain (5 year mean, 1990-1994) - Little Tern <i>Sterna albifrons</i>, 48 pairs representing at least 2.0% of the breeding population in Great Britain (5 count mean, 1993-4,1996-8) - Marsh Harrier <i>Circus aeruginosus</i>, 3 pairs representing at least 1.9% of the breeding population in Great Britain (5 year mean, 1993-1997) - Sandwich Tern <i>Sterna sandvicensis</i>, 169 pairs representing at least 1.2% of the breeding population in Great Britain (5 year mean 1991-1995) 	Some parcels favourable some unfavourable A mixture of issues, disturbance, poor pest control, grazing (poaching), agriculture and vehicle damage, dredging, engineering works, pollution or bait digging, coastal squeeze. Being closely monitored though as a SSSI with appropriate management plans ¹⁹⁵	Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹⁹³ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009101-Minsmere%E2%80%93Walberswick-SPA_tcm6-32210.pdf

¹⁹⁴ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/special/sssi/unit_details.cfm?situnt_id=1009440

¹⁹⁵ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1003208%20

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Step 2		Step 3				Step 4	Step 5	
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Alde-Ore Estuary SPA 4402.7m	<p>As well as being an important wintering area for waterbirds, the Alde-Ore Estuary provides important breeding habitat for several species of seabird, wader and raptor. During the breeding season, gulls and terns feed substantially outside the SPA.</p> <p>Over winter, the area regularly supports 24,962 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Black-tailed Godwit <i>Limosa limosa islandica</i>, Dunlin <i>Calidris alpina alpina</i>, Lapwing <i>Vanellus vanellus</i>, Shoveler <i>Anas clypeata</i>, Teal <i>Anas crecca</i>, Wigeon <i>Anas penelope</i>, Shelduck <i>Tadorna tadorna</i>, White-fronted Goose <i>Anser albifrons albifrons</i>, Redshank <i>Tringa totanus</i>, Avocet <i>Recurvirostra avosetta</i>.¹⁹⁶</p>		<p>During the winter season site supports a number of important bird species including:</p> <p>Avocet <i>Recurvirostra avosetta</i>, 766 individuals representing at least 60.3% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)</p> <p>This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:</p> <p>During the breeding season;</p> <p>Lesser Black-backed Gull <i>Larus fuscus</i>, 21,700 pairs representing at least 17.5% of the breeding Western Europe/Mediterranean/Western Africa population (Count as at 1998)</p> <p>Over winter;</p> <p>Redshank <i>Tringa totanus</i>, 1,919 individuals representing at least 1.3% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)</p> <p>Assemblage qualification: A seabird assemblage of international importance¹⁹⁷</p>		Very High	Pollution of the wetland system indirectly from construction and operational runoff into the Old Minsmere river and associated tributaries	Minor negative	Slight Adverse

¹⁹⁶ [Available Online, Accessed 22/04/2014] <http://jncc.defra.gov.uk/default.aspx?page=2010>

¹⁹⁷ [Available Online, Accessed 22/04/2014] http://www.naturalengland.org.uk/Images/UK9009112-Alde%E2%80%93Estuary-SPA_tcm6-32208.pdf

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Sizewell Marshes SSSI 861.4m	Sizewell Marshes occupies a low-lying basin of deep fen peat. The water table is permanently high, with the area being prone to flooding, and there is an extensive network of ditches across the site. ¹⁹⁸	National	Important for its large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds. Several nationally scarce plants are also present.	Stable - Favourable ¹⁹⁹	High	Pollution of the wetland system indirectly from construction and operational runoff.	Minor negative	Slight Adverse

¹⁹⁸ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003416.pdf

¹⁹⁹ [Available Online, Accessed 22/04/2014] http://www.sssi.naturalengland.org.uk/Special/sssi/unitlist.cfm?sssi_id=1003416

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Benhall Green Meadows CWS 515.8m	Consists of wet species-rich grasslands. These are bordered by the River Fromus and contain a wide range of wet meadow plants. Wild Angelica, Brown sedge, Lady's Smock, Marsh Thistle and Ragged Robin are abundant whilst Southern Marsh orchids and Greater Bird's-foot Trefoil are common. The ditches are not botanically rich, with Greater Pond Sedge, Fool's Water-cress and Lesser Water-parsnip dominating. Old records suggest there was a more diverse flora here in the past with species such as Bogbean found in the pond on the green. The floristic diversity has been maintained in the past by traditional grazing. Without such management it will become rank and overgrown and the diversity will decline. A combination of hay cutting and/or grazing, high water levels and avoidance of fertilisers and herbicides are required to maintain the considerable interest of these marshes. ²⁰⁰	Regional	Regional Designation. One of the largest remaining areas of flower-rich marsh in the Alde catchment.	Stable / declining ²⁰¹	Medium	Pollution of the wetland system indirectly from construction and operational runoff.	Minor negative	Slight Adverse

²⁰⁰ Suffolk Biological Records Centre, CWS Citations.

²⁰¹ Suffolk Biological Records Centre, CWS Citations.

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
River Fromus 0.0m adjacent to the Lodge Plantation	For further detail see the water chapter. The River Fromus runs north-south cutting across the proposed route 500m from its western terminus. The Fromus feeds into the River Alde and supports a wide variety of fish and otter and is linked to its designated sites.	Regional	Recording of Schedule 9 Species American Mink.	Unknown ²⁰²	Medium	Habitat loss/damage in works area along riverside during construction due to new culvert. Increased fragmentation from extended culvert, pollution from construction and operation indirect effect on downstream sites. Disturbance from noise and lighting during construction and operation.	Intermediate Negative	Moderate adverse

²⁰² [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Hundred River 30m east of Woodland Pit	The Hundred River runs northwest-southeast cutting across the proposed route 1200m from its eastern terminus. The Hundred River ultimately feeds into the River Alde through the marsh system. And is linked to its designated sites.	Local/Regional	Provides biodiversity value. Supports a wide variety of fish and otter.	Unknown ²⁰³	Low/Medium	Habitat loss/damage in works area along riverside during construction due to new culvert Increased fragmentation from extended culvert, pollution from construction and operation indirect effect on SAC SPA? Disturbance from noise and lighting during construction and operation.	Intermediate Negative	Moderate adverse

²⁰³ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B5D01FE34-992A-400C-9B95-6DB23C3012B5%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Buckle's Wood Ancient and Semi-Natural Woodland Adjacent to proposed road to north of route.	Small broadleaved woodland. Species present include oak, beech, ash, apple, wild cherry, hawthorn, blackthorn, ivy, dog's mercury, bluebell, herb robert, moschatel, nettle, lords and ladies, lesser celandine, false brome, false oat grass, alexanders. Buckle's Wood Pond is located adjacent to the southwest corner of this woodland. Another small waterbody can be found just outside the northern tip of the wood.	Local	Recording of Schedule 9 species red-eared terrapin. Potential for great crested newts setting badgers, nesting birds and roosting bats	Stable On a National scale ASNW declining to loss of habitat and lack of management although this woodland is stable favourable ^{204,205}	High	Direct habitat loss during construction and operation where the route bisects the woodland. Direct fragmentation/severance of between Great Wood/Pound Wood and Nursery Plantation. Disturbance from noise and lighting during construction and operation	Intermediate Negative	Large Adverse
Lodge Plantation Broad-leaved plantation Woodland 200m north of the road	Semi-mature broad-leaved plantation woodland.	Local	Provides biodiversity value but is readily replaceable.	Increasing??	Low	None likely	Neutral	Neutral

²⁰⁴ Suffolk Biological Records Centre, CWS Citations.

²⁰⁵ [Available Online, Accessed 22/04/2014] <http://www.wbrc.org.uk/atp/Ancient%20Woodland%20Threats%20-%20Woodland%20Trust.pdf>

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Coltsclose Pickle Broad-leaved plantation Woodland 120m north of the road.	Linear strip of broad-leaved plantation woodland to the north of the proposed route.	Local	UK and Suffolk BAP ²⁰⁶ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna. However, unlike Ancient Woodland, this habitat is replaceable.	Increasing ²⁰⁷	Lower	None likely	Neutral	Neutral
Bloomfield's Covert adjoined to Leekhall Plantation Mixed plantation Woodland 20m south of road.	Area of mixed plantation woodland south and adjacent to the proposed route. Two small watercourses run within the woodland area. Woodland lies to the south of the proposed routing.	Regional	UK and Suffolk BAP ²⁰⁸ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna. However, unlike Ancient Woodland, this habitat is replaceable.	Increasing ²⁰⁹	Medium	Direct damage and loss from construction and Fragmented from other woodlands by the route Pollution effects from operation of road. Reduction in air quality / pollution, primarily from operation.	Intermediate Negative	Moderate Adverse

²⁰⁶ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²⁰⁷ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²⁰⁸ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²⁰⁹ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Ash Belt Mixed plantation Woodland 175m	Attached to Bloomfield's Covert. Ash belt is a mixed planation woodland to the south of the proposed route.	Local	UK and Suffolk BAP ²¹⁰ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna. However, unlike Ancient Woodland, this habitat is replaceable.	Increasing ²¹¹	Lower	Fragmented from other woodlands by the route	Minor negative	Slight adverse
River Fromus Woodland 0.0m from road.	Linear strip of mixed woodland adjacent to the River Fromus, Mature woodland that buffers the watercourse and will support many protected fauna	Local	UK and Suffolk BAP ²¹² Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna. However, unlike Ancient Woodland, this habitat is replaceable.	Increasing ²¹³	Low	Intermediate Negative Direct damage, fragmentation and loss from construction. Pollution effects from operation of road. Reduction in air quality / pollution, primarily from operation.	Intermediate Negative	Slight Adverse

²¹⁰ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²¹¹ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²¹² [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²¹³ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Catsnap Belt 150m	Area of mixed woodland surrounded by arable fields. Woodland lies to the the south of the routing.	Local	UK and Suffolk BAP ²¹⁴ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²¹⁵	Low	None directly but fragmentation from the wider landscape	Minor Negative	Slight Adverse
Bigsby Corner Broad-leaved plantation Woodland 240m	Rectangular area of broad-leaved plantation woodland adjacent to the B1121. Woodland lies to the the south of the routing.	Local	UK and Suffolk BAP ²¹⁶ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²¹⁷	Low	None other than fragmentation from other woodlands	Minor Negative	Slight adverse

²¹⁴ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²¹⁵ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²¹⁶ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²¹⁷ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Harris's Pit Plantation Woodland 10m	Three small interconnected copses of woodland in close proximity to the proposed route. Woodland lies to the the south of the routing.	Regional	UK and Suffolk BAP ²¹⁸ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²¹⁹	Medium	Potentially deterioration in air quality during construction and operation and operation disturbance Fragmentation from other woodlands	Minor Negative	Slight adverse
Nut Tree Belt Woodland 200m	Area of mixed woodland surrounded by arable fields.	Local	UK and Suffolk BAP ²²⁰ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²²¹	Low	None directly but fragmentation from the wider landscape	Minor Negative	Slight Adverse

²¹⁸ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²¹⁹ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²²⁰ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²²¹ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Friston Covert Broad-leaved plantation Woodland 200m	Semi-mature broad-leaved plantation woodland. Woodland lies to the north of the routing.	Local	UK and Suffolk BAP ²²² Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²²³	Low	None directly but fragmentation from the wider landscape	Minor Negative	Slight Adverse
Burrell's Covert Broad-leaved plantation Woodland 170m	Semi-mature broad-leaved plantation woodland. Woodland lies to the north of the routing.	Regional	UK and Suffolk BAP ²²⁴ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²²⁵	Medium	None directly but fragmentation from the wider landscape	Minor Negative	Slight Adverse
Osierground Covert Broad-leaved plantation Woodland 100m.	Broad-leaved plantation with small waterbody adjacent to southeast corner. Woodland lies to the north of the routing.	Local	UK and Suffolk BAP ²²⁶ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²²⁷	Low	None directly but fragmentation from the wider landscape	Minor Negative	Slight Adverse

²²² [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²²³ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²²⁴ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²²⁵ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²²⁶ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²²⁷ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

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Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Woodfield Pit Narrow-leaved plantation Woodland 130m	Semi-mature narrow-leaved plantation woodland. Woodland lies to the south-east of the routing.	Local	UK and Suffolk BAP ²²⁸ Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²²⁹	Low	None directly but fragmentation from the wider landscape	Minor Negative	Slight Adverse
Habitats General								
Small tributaries and ditches (unnamed)	<p>Two tributaries and approximately 12 ditches are within 500m of the proposed road. One tributary joins the Hundred River approximately 250m north of the proposed route, whilst the other drains from near the small woodland at the junction of Fristonmoor Lane and merges with the River Fromus in a CWS region approximately 700m south of the proposed road.</p> <p>The majority of other ditches are interspersed throughout the 500m buffer zone, mostly aligning with field boundaries and form a component of the ditch network of the River Alde.</p> <p>There are a number of dry ditches in the area at the time of survey, which was carried out during a period of low flow. These ditches were culverted and well-vegetated in places.</p>	Local/Regional	<p>Potential for great crested newts in ditches/culverts.</p> <p>Provide important local flood attenuation.</p>	<p>Unknown ²³⁰</p> <p>Likely Declining due to agricultural run off, culverting etc</p>	Lower/Medium	<p>Direct pollution from construction and operation.</p> <p>Damage / destruction to ditch through construction works.</p> <p>Indirect pollution from run off into culverts and discharges</p>	Minor Negative	Slight Adverse

²²⁸ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²²⁹ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

²³⁰ [Available Online, Accessed 22/04/2014]

http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals.asp?C=3&X=%7BA840CF0D%2DBD81%2D4D44%2D87AB%2D594DBAD57F55%7D

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Step 2		Step 3					Step 4	Step 5	
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)		Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Ponds	<p>Fourty-two unnamed ponds are present within 500m of the proposed road. Three of these ponds lie to the west of the western terminus of this proposed route, eighteen lie to the north of the proposed route and 2twenty-one to the south.</p> <p>There are six ponds within 100m of the proposed works and these all have potential to be directly affected by the works.</p>	Local/Regional	Add heterogeneity to the landscape and provide habitat for aquatic macro fauna (other biodiversity benefits will be discussed within the faunal sections)		<p>Increasing on a regional scale²³¹</p> <p>However, likely declining nationally due to agricultural drainage succession and development</p>	Medium	Main potential impact is indirect, resulting from fragmentation of ponds from each other and the wider community	Intermediate Negative	Moderate Adverse

²³¹ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2008.asp?X=%7B137E07AE-58A8-4256-9B10-9F5B7A390015%7D&C=3&flipLang=&txtLogout=

Capabilities on project:

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Woodlands (unnamed)	<p>The agricultural landscape is dotted with small pockets of mature semi-natural broadleaved and mixed woodland, copses and old plantation shelter belts – not named. These have well formed canopies including common elm and ash with occasional scots pine and larch and understories of hawthorn and elder with ground layers of violet, primrose, nettle, lords and ladies, lesser celandine, alexanders, false oat grass and false brome amongst others.</p> <p>In addition to the 14 named woodlands there are six unnamed woodlands and small woodland pockets are present within 500m of the proposed works. One of these woodlands are to the north, and five to the south of the road. The closest of these woodland pockets is immediately adjacent to the crossroads of Fristonmoor Lane and the proposed road. Multiple small copses of trees and isolated stands are also within 500m of the works.</p>	Local/Regional	UK and Suffolk BAP ²³² Provide a wide range of ecosystem services, botanically rich and may support a range of wildlife, including Badger and other valued / protected flora and fauna.	Increasing ²³³	Medium	Potentially deterioration in air quality during construction and operation	Intermediate Negative	Moderate Adverse

²³² [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²³³ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B847A5BC7-42E4-4B19-8DA5-00A6E025B5D2%7D&C=3&txtLogout=&flipLang=

Capabilities on project:

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Hedgerows	<p>A 500m section of hedgerow is present along the eastern half of the proposed route. In addition, hedgerows are located at the proposed location of the western end of the route, at the site of the roudabout, and near the eastern end of the route. There is also one small segment of hedgerow, approximately 50m in length, adjacent to the crossroads of Fristonmoor Lane that will likely be affected by the works.</p> <p>The hedgerows are species rich with a mixture of blackthorn, hawthorn, ash filed maple, dog rose and other shade tolerant herbs. Cleavers and nettle are often found at the base of the hedges with ivy, elm and bramble inter-growing.</p> <p>All of these hedgerows are likely to be affected by the proposed works.</p>	Local/Regional	<p>UK and Suffolk BAP²³⁴</p> <p>Provide a wide range of ecosystem services; including connectivity, are botanically rich and the soils have been under shade for hundreds of years.</p> <p>Especially important as corridors for commuting species including bats.</p>	Fluctuating - probably increasing / improving ²³⁵	Lower/Medium	<p>Direct damage and loss from construction.</p> <p>Fragmentation effects and loss of commuting corridors for wildlife.</p> <p>Pollution effects from operation of road.</p>	Intermediate Negative	Moderate Adverse
Arable fields	Much of the land is under arable cultivation. Areas to the north and south of proposed road are used for arable agriculture.	Local	<p>As a buffer between hedgerows, woodlands and waterbodies this habitat provides a relatively undisturbed background to more valuable habitats. Probably under this landuse for hundreds of years. Can support valuable fauna and flora including bird species.</p>	Unknown ²³⁶ Likely declining due to development	Low	<p>Habitat Loss due to road construction increased pollution deposition and run off.</p>	Minor Negative	Neutral

²³⁴ [Available Online, Accessed 22/04/2014] <http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx>

²³⁵ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/status/species_habitat_nat_trends.asp?X=%7B39331CD6-CDC5-43FD-BC15-3DA13567940D%7D&C=3&txtLogout=&flipLang=

²³⁶ [Available Online, Accessed 22/04/2014] http://ukbars.defra.gov.uk/archive/outcomes/targets_nationals_2005.asp?X=%7B5364AEF4-6D6B-4DBE-B308-41E002E6F87C%7D&C=3&flipLang=&txtLogout=

Capabilities on project:

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Valued Faunal Receptors								
Badger	<p>The majority of woodlands and hedgerow embankments area suitable for setting. The agricultural landscape also offers excellent foraging habitat.</p> <p>There are numerous badger records within 500m of the route option, especially towards the west of the proposed route.</p>	Local (but un-surveyed)	Badgers will use the wooded areas and drainage ditches for setting and the agricultural landscape for foraging and commuting. This species is legally protected by the Protection of badgers Act 1992 ²³⁷	Unknown , likely increasing	Low	Small amounts of foraging habitat loss, RTAs	Minor Negative	Slight Adverse
Nesting birds	<p>The majority of woodlands and hedgerow embankments were suitable for nesting birds such as blue tit, tree sparrow, blackbird, corvids etc. The improved and semi-improved grasslands were suitable for ground nesting birds such as skylark. There is a record of barn owl close to Leiston Old Abbey (just outside 500m) and the area would provide suitable barn owl nesting and foraging habitat.</p>	Local (but un-surveyed)	<p>WCA, WCA1 and BOCC</p> <p>Many still common species are under decline throughout the country due to habitat loss and noise pollution.</p>	Varies dependent upon species	Vary dependent upon species (can be high)	Disturbance and increased RTAs, loss of foraging and nesting areas	Minor Negative	Slight Adverse

²³⁷ [Available Online, Accessed 22/04/2014] <http://www.legislation.gov.uk/ukpga/1992/51/contents>

Capabilities on project:

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Bats	<p>The majority of woodlands and hedgerow embankments are suitable for foraging and commuting bats. The farmland buildings and mature trees are likely to be suitable for roosting.</p> <p>There is one recorded bat sighting in the southeast corner of the 500m buffer zone.</p>	Local (but un-surveyed)	<p>EPS, HDir, WCA5, S42, Bonn, Bern, LBAP</p> <p>Many still common but declining due to habitat loss, common pipistrelle recovering</p> <p>UKBAP Suffolk BAP²³⁸</p>	Varies dependent upon species	Vary dependent upon species (can be high)	Disturbance and increased RTAs, loss of commuting route and foraging areas.	Minor Negative	Slight Adverse
GCN	<p>There are forty two waterbodies and numerous wet ditches and culverts within a 500m buffer of the route corridor and these have the potential to support great crested newts (GCN). There is also suitable connecting terrestrial habitat in the form of hedgerows and narrow field margins.</p> <p>There are numerous records of GCN in this area, especially to the southeast of the site area.</p>	Local/Regional depending on pond numbers	<p>EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP</p>	Declining ²³⁹	Medium	Fragmentation of habitat. Loss of terrestrial habitat	Intermediate negative	Moderate adverse
Common Reptiles	<p>The field margins, riparian corridors and hedgerows have the potential to support common reptiles.</p> <p>There are a number of records of reptiles in the vicinity of the routing.</p>	Local (but un-surveyed)	<p>WCA5, S42, UKBAP, Bern, LBAP</p>	Declining ²⁴⁰	Low	Loss of habitat, disturbance	Minor Negative	Slight Adverse

²³⁸ [Available Online, Accessed 22/04/2014] http://www.suffolkbiodiversity.org/content/suffolkbiodiversity.org/PDFs/action-plans/Suffolk%20Grouped%20Bat%20Action%20Plan%20final%20%202027_03_12.pdf

²³⁹ [Available Online, Accessed 22/04/2014] <http://www.wildlifetrust.org.uk/urban/ecorecord/bap/html/gcnewt.htm>

²⁴⁰ [Available Online, Accessed 22/04/2014] <http://www.bto.org/volunteer-surveys/gbw/gardens-wildlife/garden-reptiles-amphibians/status-britain>

Capabilities on project:

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Step 2		Step 3					Step 4	Step 5
Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Type of Impact	Magnitude of impact	Assessment score
Otter	There are multiple recordings of otter in the River Fromus.	Local/Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, CITES, Suffolk BAP	Increasing ^{241 242}	Medium	Disturbance, effects from pollution and habitat loss.	Minor Negative	Slight Adverse
Water vole	There is a recording of the water vole in the Hundred River.	Local/Regional (but un-surveyed)	EPS, HDir, WCA5, S42, UKBAP, Bern, LBAP	Declining ²⁴³	Medium	Potential fragmentation of habitat and habitat loss	Minor Negative	Slight Adverse

Reference Source(s): WebTAG unit A3 environmental impact appraisal, Department for Transport, October 2013

Summary assessment score: Moderate to Large Adverse

Qualitative comments:

The illustrative alignment for Route D2 does not bisect internationally designated sites. Internationally designated sites are present within 5km of the routing; however the closest of these is within 2km from the proposed road and Sizewell Marshes SSSI is within 1km of the eastern end of the route. They are hydrologically linked to the drainage systems in the areas therefore all though it is considered unlikely there is a small chance that these designated sites would be adversely impacted by Route D2.

The illustrative alignment for Route D2 has the potential to affect a number of habitats. Two new culverts would be required of the River Fromus and the River Hundred numerous woodlands, ponds and hedgerows would be fragmented from each other. One large advisers impact is predicted on Buckles Wood an ancient woodland as the road would cause direct habitat loss, fragmentation and likely to reduce the quality of the habitat. There is also the potential for there to be impacts downstream upon the Alde and Ore Estuaries designated sites (i.e. from pollution effects).

With regards to valued fauna, the routing is likely to affect a number of species and groups. The woodlands in the vicinity of the routing are likely to support badgers and nesting birds, and common reptiles are likely to be present within any field or woodland edge habitats. A number of ponds are present in the vicinity of the routing, therefore the potential presence of GCN must be considered, and any pond fragmentation effects addressed.

²⁴¹ Fifth Otter Survey of England, Environment Agency, 2010

²⁴² SOE State of the Environment (Anglia), Environment Agency 2010)

²⁴³ [Available Online, Accessed 22/04/2014] http://jncc.defra.gov.uk/_speciespages/115.pdf

Appendix 1.5

Site Designations and Protected Habitats Information

Appendix 1.5 – Site Designations and Protected Habitats Information

Designated Sites and Protected Habitats

A variety of sites are designated in the UK, under various Conventions, Directives and Regulations, for their nature conservation importance and interest. The general aim of these designations is to conserve and protect ecological resources in addition to raising awareness and understanding. Table A6 below outlines the statutory designations and legally protected habitats relevant to this site.

Table A9: Relevant Site Designations

Designation	Brief Description
Special Area of Conservation (SAC)	Special Areas of Conservation are sites designated by Member States under the EC Habitats Directive. The aim is to establish a European network of important high quality conservation sites that will make a significant contribution to conserving habitats and species considered to be most in need of conservation at a European level.
Special Protection Area (SPA)	Special Protection Areas are designated under the EC Birds Directive, to conserve the habitat of certain rare or vulnerable birds and regularly occurring migratory birds. Any significant pollution or disturbance to or deterioration of these sites has to be avoided.
Sites of Special Scientific Interest (SSSIs)	SSSIs are the country's very best wildlife and geological sites. There are over 4,100 SSSIs in England, covering around 8% of the country's land area. More than 70% of these sites (by area) are internationally important for their wildlife and designated as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar sites. Many SSSIs are also National Nature Reserves (NNRs) or Local Nature Reserves (LNRs). Natural England now has responsibility for identifying and protecting the SSSIs in England under the Wildlife and Countryside Act 1981 (as amended).
National Nature Reserve (NNR)	National Nature Reserves are statutory reserves established for the nation under the Wildlife and Countryside Act, 1981. NNRs may be owned by relevant national body (e.g. Natural England in England) or established by agreement; a few are owned and managed by non-statutory bodies. NNRs cover a selection of the most important sites for nature conservation in the UK
Local and County Wildlife Sites (LWS and CWS)	Local and County Wildlife Sites are non-statutory sites designated at a county level as being of conservation importance and often recognised in Local authority development plans. The aim of this identification is to protect such sites from land management changes, which may lessen their nature conservation interest, and to encourage sensitive management to maintain and enhance their importance. Although WS have no statutory protection they need to be considered in the planning process through Planning Policy Guidance like PPG9 which refers to the Town & Country Planning Act 1990 Section 30. This states that nature conservation issues should be included in the surveys of local authority areas to ensure that the plans are based on fully adequate information about local species, habitats, geology and landform. Plans should be concerned not only with designated areas but also with other land of conservation value and the possible provision of new habitats.
Ancient woodland Ancient Semi-natural Woodland (ASNW) Plantation on Ancient Woodland Site (PAWS)	Ancient Woodland is land that has had a continuous woodland cover since at least 1600 AD and has only been cleared for underwood or timber production. It can be placed in two categories: Ancient Semi-natural Woodland (ASNW) – woodland that retains a native tree and shrub cover that has not been planted, although it may have been managed by coppicing or felling and allowed to regenerate naturally. This covers all stands of ancient woodland which do not obviously originate from planting. Ancient replanted Woodland (AWS - ancient woodland site or– woodland where the original tree cover has been felled and replaced by planting, often with conifers and usually this century.

Appendix 1.6

Relevant Legislation and Protected Species Surveying Information

Capabilities on project:
Environment

Appendix 1.6 – Relevant Legislation and Protected Species Surveying Information

Multiple legislative policies apply to the proposed schemes. Information on these policies can be seen in Tables A11 and A12 below. Please refer to the actual legislation for the precise wording, the tables below provide a summary only.

To ensure offences are not triggered under these legislative policies, species specific surveys may be required. The timings of these surveys can be seen in Table A13 below.

Table A11: Key Protection Afforded to Species and Habitats

Legislation	Brief Description
EU / Worldwide	
The Birds Directive (79/409/EEC)	This Directive aims to maintain the favourable conservation status of all wild bird species (Article 2). It establishes a general scheme for the protection of all wild birds (Article 5). The Directive also requires the identification and classification of Special Protection Areas (SPAs) for rare or vulnerable species listed in Annex I of the Directive and regularly occurring migratory species.
The Habitats Directive (92/43/EEC)	Annex II of this Directive lists the European protected species that are afforded special protection under this Directive. Refer to The Conservation of Habitats and Species Regulations 2010, as amended section below for the implications of this Directive in the UK context. The directive requires member states to contribute to a coherent European ecological network of protected sites by designating Special Areas of Conservation (SACs) for habitats listed on Annex I and for species listed on Annex II.
Convention on Biological Diversity	Conservation of biodiversity (the variety of life on earth) is an essential element of sustainable development. The UK Biodiversity Action Plan (BAP) provides the framework for fulfilling the UK's responsibilities towards the Convention on Biological Diversity via the Natural Environment and Rural Communities Act 2006 (NERC Act). See Error! Reference source not found. for more information on the UK BAP list.
UK	
Wildlife and Countryside Act, 1981 (as amended) (WCA)	<p>The WCA sets out the protection offered to various species of plants, birds and animals in England and Wales. Bird species listed in Schedule 1, animal species listed in Schedule 5 and plant species listed in Schedule 8 of the WCA are protected.</p> <p>Under section 14(2) of the WCA it is an offence to "<i>plant or otherwise cause to grow in the wild</i>" any plant listed in Schedule 9, Part II of the Act. Japanese knotweed (<i>Fallopia japonica</i>) is a Schedule 9, Part III species.</p> <p>The WCA has since been strengthened and updated by the Countryside and Rights of Way Act 2000 (CRoW Act) (see below).</p>
Protection of Badgers Act 1992	Offences under this Act include: (1) taking, injuring or killing badgers; (2) cruelty to badgers; (3) interference with badger setts; (4) selling and possession of live badgers and (5) marking and ringing. Exceptions and licences can apply.

Capabilities on project:
Environment

Legislation	Brief Description
The Conservation of Habitats and Species Regulations 2010 as amended (known as the Habitats Regulations)	<p>The Habitats Regulations update and consolidate the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) and are the transposition of the Habitats Directive into English Law.</p> <p>The key relevant schedules are as follows:</p> <ul style="list-style-type: none"> ▪ Schedule 2 lists the European protected species of animals; and ▪ Schedule 5 lists European protected species of plants. <p>Under the Habitat Regulations, it is illegal to deliberately capture, injure, kill, disturb, take or destroy the eggs, or damage or destroy the breeding site or resting place of a European protected species (listed in Schedule 2).</p> <p>It is also illegal to deliberately pick, collect, cut, uproot or destroy the European protected species of plants listed in Schedule 5.</p> <p>For all species listed on Schedule 2 and Schedule 5, it is illegal to possess, control, transport, offer for sale or exchange, or sell or exchange any live or dead individual, or anything derived from or any part of such as species.</p> <p>Licences can only be granted for certain purposes but only if a set of conditions have been met.</p>
Countryside and Rights of Way Act 2000 (CRoW Act)	<p>The CRoW Act strengthens the legal protection offered to species listed on Schedule 1 and Schedule 5 of the WCA by introducing a new offence of '<i>reckless disturbance</i>'.</p> <p>Section 74 of the CRoW Act, which provided a statutory basis for biodiversity conservation to be undertaken as a matter of policy, has now been replaced by sections 40, 41 and 42 of the Natural Environment and Rural Communities Act 2006 (NERC Act).</p>
Natural Environment and Rural Communities Act 2006 (NERC Act)	<p>The NERC Act created a new integrated agency 'Natural England' to act as a champion for the natural environment and officially established a Commission for Rural Communities.</p> <p>This Act makes provision in respect of biodiversity, pesticides harmful to wildlife and the protection of birds, and in respect of invasive non-native species. It alters enforcement powers in connection with wildlife protection, and extends time limits for prosecuting certain wildlife offences. It addresses a small number of gaps and uncertainties which have been identified in relation to the law on Sites of Special Scientific Interest (SSSIs). It also amends the functions and constitution of National Park authorities, the functions of the Broads Authority and the law on rights of way.</p> <p>Section 40 to 42 of the NERC Act replace and extend the requirements of Section 74 of the CRoW Act. Section 40(1) of the NERC Act states every public body, including local planning authorities, must '<i>have regard</i>' for conserving biodiversity.</p>
Water Environment (Water Framework Directive) (England and Wales) Regulations 2003	<p>This is the implementation of the Water Framework Directive, which was transposed into UK national legislation in 2003, whereby River Basin Management Plans and associated works and monitoring are the key means of achieving these targets.</p>

N.B. Proposed developments must be able to show that all reasonable measures have been taken to ensure that protected species are not disturbed. The habitats of all Habitat Regulations Schedule 2 species, WCA Schedule 1 and some WCA Schedule 5 species are also protected from disturbance and destruction. Again, all reasonable precautions should be taken to ensure that this does not happen.

Capabilities on project:
Environment

Non-Native Plant Species

Section 14 of the Wildlife and Countryside Act 1981 (as amended) makes the introduction of certain non-native invasive species into the wild an offence. It is an offence to plant or otherwise cause to grow in the wild any plant which is included in Part II of Schedule 9 of the Act.

Legally Protected Species

In addition to habitats, a number of species have now become so rare that they are also afforded protection through international/European and national law. Other species are considered to contribute to our 'quality of life'. The specific protection afforded to species relevant to this site is detailed in Table A9 Below.

Table A12: Species Specific Legislation

Species	Brief Description
Bats Otters Great Crested Newts	<p>These species are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended).</p> <p>These species are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are subject to the provisions of Section 9 of the Act, which make it an offence to:</p> <ul style="list-style-type: none"> - intentionally or recklessly disturb a wild animal listed on Schedule 5 whilst it is occupying a structure or place which it uses for shelter or protection; - intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a wild animal listed on Schedule 5; - sell, offer or expose for sale, or to possess or transport for sale a live or dead wild animal listed on Schedule 5 or any part of or anything derived from a wild animal listed on Schedule 5. <p>These species are also listed on Schedule 2 (European protected species of animals) of the Conservation of Habitats and Species Regulations 2010 (as amended) and are subject to the provisions of Regulation 41 which makes it an offence to:</p> <ul style="list-style-type: none"> - deliberately capture, injure or kill any wild animal of a European protected species; - deliberately disturb wild animals of any such species (where disturbance is likely to impair their ability to survive, breed or reproduce, rear or nurture their young; or to hibernate or migrate; or to affect significantly the local distribution or abundance of the species); - damage or destroy a breeding site or resting place of such an animal; or - be in possession of, control, transport, sell or exchange, or offer for sale or exchange any live or dead animal of such a species or any part of a wild animal or anything derived from an animal or any part of an animal of such a species.
Water Voles	<p>Water voles are protected under the Wildlife and Countryside Act 1981 (as amended). Water voles are listed on Schedule 5 of the Act and are subject to all of the provisions of Section 9 of the Act, which make it an offence to:</p> <ul style="list-style-type: none"> - intentionally kill, injure or take a water vole; - possess or control any live or dead specimen or anything derived from a water vole; - intentionally or recklessly damage or destroy any structure or place used for shelter or protection by a water vole; - intentionally or recklessly disturb a water vole whilst it is occupying a structure or place which it uses for shelter or protection; - intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a water vole; - sell, offer or expose for sale, or to possess or transport for sale a live or dead water vole or any part of or anything derived from a water vole.

Capabilities on project:
Environment

Species	Brief Description
Badgers	<p>Badgers are protected under the Protection of Badgers Act 1992. The Act makes it an offence to:</p> <ul style="list-style-type: none"> - wilfully kill, injure or take, or attempt to kill, injure or take, a badger; - possess or control a dead badger or any part of, or anything derived from, a dead badger; - cruelly ill-treat a badger; - intentionally or recklessly interfere with a badger sett by doing any of the following things: <ul style="list-style-type: none"> - damaging a badger sett or any part of it; - destroying a badger sett; - obstructing access to, or any entrance of, a badger sett; or - disturbing a badger when it is occupying a badger sett.
Birds	<p>All wild birds, their nests and eggs are protected under the Wildlife and Countryside Act 1981 (as amended). Section 1 of the Act makes it an offence to:</p> <ul style="list-style-type: none"> - intentionally kill, injure or take any wild bird; - intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built; or - intentionally take or destroy an egg of any wild bird. <p>It is also an offence to:</p> <ul style="list-style-type: none"> - intentionally disturb any wild bird included in Schedule 1 of the Act while it is building a nest or is in, on or near a nest containing eggs or young; or - disturb dependent young of such a bird. <p>Species listed on Schedule 1 include the barn owl (<i>Tyto alba</i>), Cetti's warbler (<i>Cettia cetti</i>) and kingfisher (<i>Alcedo atthis</i>)</p>
Reptiles	<p>All native British reptile species are protected under the Wildlife and Countryside Act 1981 (as amended). Reptiles are listed under Schedule 5 of the Act. The four more widespread species including common lizard, slow worm, adder and grass snake are subject to some of the provisions of Section 9 of the Act, which make it an offence to:</p> <ul style="list-style-type: none"> - intentionally kill or injure a reptile; or - sell, offer or expose for sale, or to possess or transport for sale a live or dead reptile or any part of, or anything derived from, a reptile.
Hedgerows	<p>The Hedgerow Regulations 1997 provide statutory protection for hedgerows. Hedges that are deemed to be important under the regulations are protected and must not be removed without consulting the local planning authority.</p> <p>Important hedgerows are those which are:</p> <ol style="list-style-type: none"> a) Greater than 30 years old; and b) meet a number of criteria based on number of species and/or features present

Capabilities on project:
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Table A13: Habitat/Species Specific Survey Timings

HABITAT/SPECIES TYPE	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Phase 1 Survey	Sub optimal			Optimal						Sub optimal			
National Vegetation Classification	Survey inappropriate		Habitat dependent								Sub optimal		Survey inappropriate
Hedgerows	Survey inappropriate			Sub optimal	Optimal		Sub optimal					Survey inappropriate	
River Habitat Survey	Sub optimal				Optimal		Sub optimal						
River Corridor Survey	Survey inappropriate			Sub optimal		Optimal			Sub optimal	Survey inappropriate			
Breeding Birds	Survey inappropriate		Sub optimal	Optimal			Sub optimal	Survey inappropriate					
Wintering Birds	Optimal		Sub optimal	Survey inappropriate						Sub optimal	Optimal		
Migrating/Passage Birds	Survey inappropriate		Optimal		Survey inappropriate				Optimal		Survey inappropriate		
Badgers	Sub optimal	Optimal			Sub optimal			Optimal			Sub optimal		
Bat Hibernation	Optimal		Sub optimal	Survey inappropriate							Optimal		
Bat Activity	Survey inappropriate			Sub optimal	Optimal				Sub optimal	Survey inappropriate			
Water Voles	Survey inappropriate	Sub optimal		Optimal							Sub optimal	Survey inappropriate	
Otters	Spring and neap tides dependent												
Red Squirrels	Sub optimal		Optimal						Sub optimal				
Dormice Nest Search	Optimal		Sub optimal							Optimal			
Dormice Boxes	Survey inappropriate		Optimal								Survey inappropriate		
Great Crested Newts	Survey inappropriate		Optimal				Survey inappropriate						
Reptiles	Survey inappropriate		Sub optimal	Seasonally dependent				Sub optimal	Optimal	Sub optimal	Survey inappropriate		
Fish	Species dependent												
White-Clawed Crayfish	Survey inappropriate			Sub optimal			Optimal					Survey inappropriate	Survey inappropriate
Fresh Water Invertebrates	Survey inappropriate		Optimal		Seasonally dependent				Optimal		Survey inappropriate		
Terrestrial Invertebrates	Survey inappropriate		Sub optimal		Species dependent					Sub optimal		Survey inappropriate	

Key

- Optimal/recommended period for survey
- Sub optimal period for survey
- Survey inappropriate

Licensed surveyors required for certain species and types of survey

Appendix 1.7

Protected and Notable Species Records

Capabilities on project:
Environment

Appendix 1.7 – Protected and Notable Species Records

Tables A15 to A18 below outline the records of protected and notable species recorded in the vicinity of the proposed routings.

Table A15: Route Option Middleton Moor Bypass (A) Protected Species Records

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
34	Brown Long-eared Bat	<i>Plecotus auritus</i>	Yoxford	TM40686829	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2013
58	Little Owl	<i>Athene noctua</i>	Middleton	TM415674	Bern2, CITESA	Adult and 2 young	1995
201	Brown Long-eared Bat	<i>Plecotus auritus</i>	Middleton	TM421674	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Hibernating bat	2005
236	Barn Owl	<i>Tyto alba</i>	Yoxford	TM405682	BAmb, Bern2, CITESA, ScotBL, WCA1i		1995
259	European Water Vole	<i>Arvicola amphibius</i>	Middleton	TM42156743	ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.2, WCA5/9.4a, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1997
262	West European Hedgehog	<i>Erinaceus europaeus</i>	Middleton	TM415678	Bern3, Sect.41, Sect.42, UKBAP		1993
262	Grass Snake	<i>Natrix natrix</i>	Middleton Moor	TM415678	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b	Adult	2005
262	Galingale	<i>Cyperus longus</i>	Middleton Moor	TM415678	NS, RLGB.Lr(NT)		2004
262	Great Crested Newt	<i>Triturus cristatus</i>	Middleton	TM415678	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Adults and eggs present	2011
287	Grass Snake	<i>Natrix natrix</i>	Yoxford	TM410685	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b		1997
301	Common Toad	<i>Bufo bufo</i>	Middleton Moor	TM415679	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b	Several adults	1999
323	Little Owl	<i>Athene noctua</i>	Middleton	TM413672	Bern2, CITESA	Roosting	1996

Capabilities on project:
Environment

Table A16: Route Option Theberton Bypass East (B + D) Protected Species Records

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
46	Norfolk Hawker	<i>Aeshna isosceles</i>	Theberton	TM441656	RLGB.EN, Sect.41, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.2, WCA5/9.4a, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2007
60	Little Owl	<i>Athene noctua</i>	Theberton	TM433666	Bern2, CITESA		1995
135	Pipistrelle	<i>Pipistrellus pipistrellus</i>	Leiston	TM448644	Bern2, Bern3, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.42, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1993
160	Little Owl	<i>Athene noctua</i>	Westleton	TM433667	Bern2, CITESA		1995
207	Grass Snake	<i>Natrix natrix</i>	Theberton	TM431667	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b	Adult	2005
226	Brown Long-eared Bat	<i>Plecotus auritus</i>	Theberton	TM442662	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1993
229	Spindle Knot-horn	<i>Nephopterix angustella</i>	Theberton	TM43806575	Nb		2008
229	Feathered Gothic	<i>Tholera decimalis</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Hedge Rustic	<i>Tholera cespitis</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Rosy Rustic	<i>Hydraecia micacea</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	White-line Dart	<i>Euxoa tritici</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Small Square-spot	<i>Diarsia rubi</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Centre-barred Sallow	<i>Atethmia centrigo</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Mouse Moth	<i>Amphipyra tragopoginis</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Grey Dagger	<i>Acrionicta psi</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
229	Dark-barred Twin-spot Carpet	<i>Xanthorhoe ferrugata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Blood-Vein	<i>Timandra comae</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Shaded Broad-bar	<i>Scotopteryx chenopodiata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Dark Spinach	<i>Pelurga comitata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Dusky Thorn	<i>Ennomos fuscantaria</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Latticed Heath	<i>Chiasmia clathrata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
229	Marbled Yellow Pearl	<i>Evergestis extimalis</i>	Theberton	TM43806575	Nb		2008
229	Buff Ermine	<i>Spilosoma luteum</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
238	Eurasian Hobby	<i>Falco subbuteo</i>	Theberton	TM435667	Bern2, CITESA, CMS_A2, ScotBL, WCA1i		1995
240	Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Theberton	TM437659	Bern2, Bern3, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Maternity roost, 100+ counted	2012
240	Little Owl	<i>Athene noctua</i>	Theberton Churchyard	TM437659	Bern2, CITESA		1995
260	Brown Long-eared Bat	<i>Plecotus auritus</i>	Westleton	TM445645	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Roost	2012
290	Common Toad	<i>Bufo bufo</i>	Westleton	TM442664	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b		2008
314	Bats	<i>Chiroptera</i>	Theberton	TM436659		Occasional roost	2004
322	Little Owl	<i>Athene noctua</i>	Theberton	TM437658	Bern2, CITESA		1997
326	Brown Long-eared Bat	<i>Plecotus auritus</i>	Theberton	TM443662	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1993

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
346	Grass Snake	<i>Natrix natrix</i>	Theberton	TM447652	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b		2006
346	Great Crested Newt	<i>Triturus cristatus</i>	Theberton	TM447652	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2007
357	Brown Long-eared Bat	<i>Plecotus auritus</i>	Theberton	TM445652	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2002
357	Serotine	<i>Eptesicus serotinus</i>	Theberton	TM445652	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2000
366	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM445643	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1998
388	Norfolk Hawker	<i>Aeshna isosceles</i>	Theberton	TM444661	RLGB.EN, Sect.41, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.2, WCA5/9.4a, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2007
388	Wall	<i>Lasiommata megera</i>	Theberton	TM444661	RLGB.Lr(NT), Sect.41, Sect.42, UKBAP		2005
388	Grayling	<i>Hipparchia semele</i>	Theberton	TM444661	RLGB.VU, Sect.41, Sect.42, UKBAP		2005
388	White-letter Hairstreak	<i>Satyrrium w-album</i>	Theberton	TM444661	RLGB.EN, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b		2005
391	Eurasian Badger	<i>Meles meles</i>	Middleton	TM42886671	Bern3, PBA, ScotBL		2009
399	Eurasian Badger	<i>Meles meles</i>	Theberton	TM435659	Bern3, PBA, ScotBL		2012
399	Little Owl	<i>Athene noctua</i>	Theberton	TM435659	Bern2, CITESA		1996
416	Harvest Mouse	<i>Micromys minutus</i>	Eastbridge	TM4520064600	Sect.41, Sect.42, UKBAP		2009
426	Harvest Mouse	<i>Micromys minutus</i>	Theberton	TM4440066200	Sect.41, Sect.42, UKBAP		2010
434	Spotted Flycatcher	<i>Muscicapa striata</i>	Theberton	TM444663	Bern2, BRed, CMS_A2, ScotBL, Sect.41, Sect.42, UKBAP	Nesting	2007

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
437	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM445642	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1998
453	Brown Hare	<i>Lepus europaeus</i>	Leiston	TM451649	ScotBL, Sect.41, Sect.42, UKBAP		1993
455	Brown Long-eared Bat	<i>Plecotus auritus</i>	Theberton	TM446652	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Roost	2006
455	Grass Snake	<i>Natrix natrix</i>	Theberton	TM446652	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b	Observed in garden annually, including young	2010
455	Common Toad	<i>Bufo bufo</i>	Theberton	TM446652	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b	Observed over years, declining abundance	2010
459	Little Owl	<i>Athene noctua</i>	Middleton	TM433670	Bern2, CITESA		1996

Capabilities on project:
Environment

Table A17: Route Option Theberton Bypass West (C + D) Protected Species Records

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
5	Eurasian Badger	<i>Meles meles</i>	Middleton	TM42886671	Bern3, PBA, ScotBL		2009
40	Grass Snake	<i>Natrix natrix</i>	Middleton	TM428668	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b	Adult	2007
95	Grass Snake	<i>Natrix natrix</i>	Theberton	TM431667	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b	Adult	2005
116	Norfolk Hawker	<i>Aeshna isosceles</i>	Theberton	TM441656	RLGB.EN, Sect.41, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.2, WCA5/9.4a, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2007
124	Common Kestrel	<i>Falco tinnunculus</i>	Middleton	TM427667	BAmb, Bern2, CITESA, CMS_A2, ScotBL, Sect.42		1997
135	Pipistrelle	<i>Pipistrellus pipistrellus</i>	Leiston	TM448644	Bern2, Bern3, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.42, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1993
206	Spindle Knot-horn	<i>Nephopterix angustella</i>	Theberton	TM43806575	Nb		2008
206	Feathered Gothic	<i>Tholera decimalis</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Hedge Rustic	<i>Tholera cespitis</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Rosy Rustic	<i>Hydraecia micacea</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	White-line Dart	<i>Euxoa tritici</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Small Square-spot	<i>Diarsia rubi</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Centre-barred Sallow	<i>Atethmia centrago</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
206	Mouse Moth	<i>Amphipyra tragopoginis</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Grey Dagger	<i>Acrionicta psi</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Dark-barred Twin-spot Carpet	<i>Xanthorhoe ferrugata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Blood-Vein	<i>Timandra comae</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Shaded Broad-bar	<i>Scotopteryx chenopodiata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Dark Spinach	<i>Pelurga comitata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Dusky Thorn	<i>Ennomos fuscantaria</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Latticed Heath	<i>Chiasmia clathrata</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
206	Marbled Yellow Pearl	<i>Evergestis extimalis</i>	Theberton	TM43806575	Nb		2008
206	Buff Ermine	<i>Spilosoma luteum</i>	Theberton	TM43806575	Sect.41, Sect.42, UKBAP		2008
228	Eurasian Badger	<i>Meles meles</i>	Theberton	TM435659	Bern3, PBA, ScotBL		2012
228	Little Owl	<i>Athene noctua</i>	Theberton	TM435659	Bern2, CITESA		1996
237	Little Owl	<i>Athene noctua</i>	Theberton	TM437658	Bern2, CITESA		1997
251	Little Owl	<i>Athene noctua</i>	Theberton	TM433666	Bern2, CITESA		1995
260	Brown Long-eared Bat	<i>Plecotus auritus</i>	Westleton	TM445645	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Roost	2012
282	Little Owl	<i>Athene noctua</i>	Westleton	TM433667	Bern2, CITESA		1995
294	Bats	<i>Chiroptera</i>	Theberton	TM436659		Occasional roost	2004

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
301	Brown Long-eared Bat	<i>Plecotus auritus</i>	Theberton	TM446652	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Roost	2006
331	Barn Owl	<i>Tyto alba</i>	Middleton	TM426665	BAmb, Bern2, CITESA, ScotBL, WCA1i		1996
334	Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Theberton	TM437659	Bern2, Bern3, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Maternity roost, 100+ counted	2012
334	Little Owl	<i>Athene noctua</i>	Theberton Churchyard	TM437659	Bern2, CITESA		1995
346	Great Crested Newt	<i>Triturus cristatus</i>	Theberton	TM447652	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2007
346	Grass Snake	<i>Natrix natrix</i>	Theberton	TM447652	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b		2006
357	Brown Long-eared Bat	<i>Plecotus auritus</i>	Theberton	TM445652	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2002
357	Serotine	<i>Eptesicus serotinus</i>	Theberton	TM445652	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2000

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
366	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM445643	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1998
416	Harvest Mouse	<i>Micromys minutus</i>	Eastbridge	TM4520064600	Sect.41, Sect.42, UKBAP		2009
437	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM445642	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1998
451	Little Owl	<i>Athene noctua</i>	Middleton	TM433670	Bern2, CITESA		1996
453	Brown Hare	<i>Lepus europaeus</i>	Leiston	TM451649	ScotBL, Sect.41, Sect.42, UKBAP		1993
455	Brown Long-eared Bat	<i>Plecotus auritus</i>	Theberton	TM446652	Bern2, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b	Roost	2006
455	Grass Snake	<i>Natrix natrix</i>	Theberton	TM446652	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b	Observed in garden annually, including young	2010
455	Common Toad	<i>Bufo bufo</i>	Theberton	TM446652	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b	Observed over years, declining abundance	2010
473	Eurasian Hobby	<i>Falco subbuteo</i>	Theberton	TM435667	Bern2, CITESA, CMS_A2, ScotBL, WCA1i		1995

Capabilities on project:

Environment

Table A18: Route Option D2 Protected Species Records

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
2	Little Owl	<i>Athene noctua</i>	Leiston	TM445638	Bern2, CITESA		1997
22	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	Leiston	TM424629	BAmb, BD1, CITESA, CMS_A2, ScotBL, WCA1i		1995
23	Common Kestrel	<i>Falco tinnunculus</i>	Knodishall	TM418627	BAmb, Bern2, CITESA, CMS_A2, ScotBL, Sect.42		1996
24	Little Owl	<i>Athene noctua</i>	Buckles Wood	TM428633	Bern2, CITESA		1996
31	Barn Owl	<i>Tyto alba</i>	Saxmundham	TM379625	BAmb, Bern2, CITESA, ScotBL, WCA1i		1996
43	Little Owl	<i>Athene noctua</i>	Theberton	TM427632	Bern2, CITESA		1996
54	Little Owl	<i>Athene noctua</i>	East Suffolk	TM385625	Bern2, CITESA		1995
57	Eurasian Water Shrew	<i>Neomys fodiens</i>	Buckles Wood	TM433634	Bern3		1995
76	European Otter	<i>Lutra lutra</i>	Saxmundham	TM3879462480	Bern2, CITESA, HabRegs2, HSD2p, HSD4, RLGLB.NT, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2007
77	Barn Owl	<i>Tyto alba</i>	Saxmundham	TM406625	BAmb, Bern2, CITESA, ScotBL, WCA1i		1996
85	Common Lizard	<i>Zootoca vivipara</i>	Leiston	TM428631	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b		1999
102	Barn Owl	<i>Tyto alba</i>	East Suffolk	TM420628	BAmb, Bern2, CITESA, ScotBL, WCA1i		1995
116	Little Owl	<i>Athene noctua</i>	Buckles Wood	TM428634	Bern2, CITESA		1997
119	Eurasian Badger	<i>Meles meles</i>	Saxmundham	TM391625	Bern3, PBA, ScotBL		2012
159	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	Leiston	TM447637	BAmb, BD1, CITESA, CMS_A2, ScotBL, WCA1i		1995
163	Eurasian Badger	<i>Meles meles</i>	Saxmundham	TM38356260	Bern3, PBA, ScotBL		2004

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
166	Brown Hare	<i>Lepus europaeus</i>	Knodishall	TM418625	ScotBL, Sect.41, Sect.42, UKBAP		2010
209	Tortula schimperi	<i>Tortula schimperi</i>	Knodishall	TM408627	NR(vp)		2012
241	White Admiral	<i>Limenitis camilla</i>	Leiston	TM448640	RLGB.VU, Sect.41, Sect.42, UKBAP		1995
241	Grayling	<i>Hipparchia semele</i>	Leiston	TM448640	RLGB.VU, Sect.41, Sect.42, UKBAP		1995
243	Common Kestrel	<i>Falco tinnunculus</i>	Leiston	TM428628	BAmb, Bern2, CITESA, CMS_A2, ScotBL, Sect.42		1996
248	Barn Owl	<i>Tyto alba</i>	Leiston	TM430635	BAmb, Bern2, CITESA, ScotBL, WCA1i		1995
248	Little Owl	<i>Athene noctua</i>	Leiston	TM430635	Bern2, CITESA		1995
252	Tawny Owl	<i>Strix aluco</i>	Buckles Wood	TM433636	Bern2, CITESA	Nest with young	1996
267	Common Lizard	<i>Zootoca vivipara</i>	Leiston	TM437631	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b		2011
267	Grass Snake	<i>Natrix natrix</i>	Leiston	TM437631	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b		2011
267	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM437631	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2011
267	Common Toad	<i>Bufo bufo</i>	Leiston	TM437631	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b		2011
279	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM436630	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2011

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
287	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM445642	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1998
299	Lecanora persimilis	<i>Lecanora persimilis</i>	Leiston	TM424633	NS		2002
299	Cladonia chlorophaea	<i>Cladonia chlorophaea</i>	Leiston	TM424633	NR(vp), NS		2002
309	Lecania hutchinsiae	<i>Lecania hutchinsiae</i>	Leiston	TM444642	NS		1999
309	Rinodina pityrea	<i>Rinodina pityrea</i>	Leiston	TM444642	NR(vp)		1999
309	Cyrtidula hippocastani	<i>Cyrtidula hippocastani</i>	Leiston	TM444642	NS		1998
337	Barn Owl	<i>Tyto alba</i>	Leiston	TM449640	BAmb, Bern2, CITESA, ScotBL, WCA1i		1995
347	Common Toad	<i>Bufo bufo</i>	Leiston	TM432629	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b	Over a hundred counted	1999
353	Eurasian Badger	<i>Meles meles</i>	Leiston	TM4420163295	Bern3, PBA, ScotBL		2012
382	Grass Snake	<i>Natrix natrix</i>	Saxmundham	TM385629	Bern3, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.5a, WCA5/9.5b		2011
385	Great Crested Newt	<i>Triturus cristatus</i>	Leiston	TM445643	Bern2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1998
390	Eurasian Badger	<i>Meles meles</i>	Saxmundham	TM38056206	Bern3, PBA, ScotBL		2004
444	Tawny Owl	<i>Strix aluco</i>	Leiston	TM444633	Bern2, CITESA		1994

Capabilities on project:
Environment

Proximity to Study Area (m)	Species	Scientific Name	Location	Grid reference	Legal and BAP Status*	Comments	Date
446	European Otter	<i>Lutra lutra</i>	Saxmundham	TM388629	Bern2, CITESA, HabRegs2, HSD2p, HSD4, RLGLB.NT, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2008
446	Grey Wagtail	<i>Motacilla cinerea</i>	Saxmundham	TM388629	BAmb, Bern2		2006
447	Little Owl	<i>Athene noctua</i>	Buckles Wood	TM430637	Bern2, CITESA		1996
467	European Water Vole	<i>Arvicola amphibius</i>	Leiston	TM4197263164	ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.2, WCA5/9.4a, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		2007
468	Pipistrelle	<i>Pipistrellus pipistrellus</i>	Leiston	TM436628	Bern2, Bern3, CMS_A2, CMS_EUROBATS-A1, HabRegs2, HSD4, ScotBL, Sect.42, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b		1993
484	Eurasian Siskin	<i>Carduelis spinus</i>	Sizewell	TM443632	Bern2, ScotBL		1995
484	Common Kestrel	<i>Falco tinnunculus</i>	Leiston	TM443632	BAmb, Bern2, CITESA, CMS_A2, ScotBL, Sect.42		1996

Appendix 1.8

Mitigation Information

Capabilities on project:
Environment

Appendix 1.8 – Mitigation Information

Table A14 Below outlines generic mitigation requirements and recommendations likely to be applicable to the A12 and Four Villages scheme.

Table A14: Mitigation

Receptor	Mitigation
Habitats General Construction	<ul style="list-style-type: none"> - All Site staff will receive a tool box talk on the various ecological sensitivities of the Proposed Development as part of their site induction. Sensitive receptors, their characteristics and mitigation requirements will be outlined. - CEMP to be drawn up with input from an Ecologist and implemented and monitored by an Environmental Manager, who will be responsible for the safe retention of the sensitive ecological areas. The success of protective measures will be reviewed every two months to ensure that all areas are adequately protected. - An Ecological CoW will be present throughout the construction phases where works have the potential to impact upon sensitive receptors as outlined in the Webtag report and the CEMP. - Working corridors will be demarcated to prevent damage to habitats of value such as semi-improved neutral grassland. - Where biodiverse habitat is to be lost, the soil will be stored separating top soil and subsoil for use in later habitat creation and for the creation of the bunds it is important that the soil is removed by excavator and then transferred via loose tipping to ensure that the soil structure is not damaged. The works will be undertaken to the Construction Code of Practice for the Sustainable Use of Soils (2009). - Excavated topsoil will be stored and replaced to conserve soil biodiversity. - Soil storage mounds will be securely covered to prevent run-off into the watercourses or the spread of airborne particulates. - The bunds will be no more than 1m high (to prevent compaction and loss of structure within the soil and with breaks every 10m to allow for water to run off the Site. - The replaced topsoil will be grassed over - Ensure that work compounds and access tracks, etc. are not located in, or adjacent to, areas that maintain habitat value - Establish site fencing to prevent access to areas outside of construction working areas, particularly in areas adjacent to features of interest/value - Cover Site safety issues, including storage of potentially dangerous materials
Habitats General Operation	<ul style="list-style-type: none"> - Habitats will be replaced with native species of local provenance designed by an ecologist in conjunction with a landscape designer. The habitat will be designed to be multifunctional providing mitigation for a number of species.
Trees and hedgerows Construction	<ul style="list-style-type: none"> - All works in the vicinity of trees or hedgerows to be retained will be undertaken to BS5837:2012 guidelines, including the erection of robust protective fencing encompassing root protection areas of all trees and hedgerows not to be impacted and to incorporate the necessary Root Protection Areas (RPAs) - An AIA will be undertaken to ensure that trees and hedgerows will be retained where possible -
Trees and hedgerows	<ul style="list-style-type: none"> - Replacement habitat will be provided following construction of the scheme either on or off site

Capabilities on project:
Environment

Receptor	Mitigation
Operation	<ul style="list-style-type: none"> - This habitat will be native and of local provenance and designed by an ecologist in conjunction with a landscape designer - These habitat creations will be multifunctional and provide mitigation for a number of species (see faunal sections)
Watercourses Construction	<ul style="list-style-type: none"> - The duration and spatial extent of works in the vicinity of watercourses will be minimised - The EcOW will inspect the maintenance of all erosion controls weekly and after heavy rainfall events - Any abstractions from watercourses will be identified and quantified. Formal consent from the EA will be sought for any abstractions from watercourses - Site compounds will be located away from watercourses and floodplains; - The storage of any materials on the floodplain or near tributaries to reduce risk of pollutants/fine sediment entering watercourses will be regulated - Under the Water Resources Act 1991, the prior written consent of the Environment Agency is required for any proposed works or structures, in, under, over or within 8 metres of the top of the bank of a main river or floodbank. Under the Land Drainage byelaws 1981, consent is also required for any works that affect the flow in watercourses which are not a main river. Additionally, the Environment Agency's 'Pollution Prevention Guidelines: Works and Maintenance in or Near Water', should be referred to¹. - Excavation and enabling works will follow best practice and will adhere to the Environment Agency's Pollution Prevention Guidance Notes (PPGs) will be adhered to throughout the construction process. In particular: <ul style="list-style-type: none"> o PPG 1 General Guide to the Prevention of Water Pollution; o PPG 5 Works In, Near or Liable to Affect Watercourses; o PPG 6 Working at Construction and Demolition Sites; o PPG 8 Safe Storage and Disposal of Used Oils; and o PPG 20 Dewatering Underground Ducts and Chambers. - No in-channel works should be conducted on watercourses likely to support migratory fish between October 14th and May 31st in this case sea trout. - All landscaping and drainage engineering works taking place within close proximity to the waterways will require an activity-specific method statement, which will describe the specific control measures that will be applied to the activity to ensure water quality impacts will be avoided. These method statements will be agreed with the Environment Agency prior to the start of the works. In some instances it may be necessary for contractors to alter their proposed works (extent/duration/timing) in order to ensure significant impacts to the River and potentially to breeding birds can be avoided. Such methods statements are expected to include a description of the extent, duration and timing of works and the machinery to be used, followed by details of avoidance measures that will be taken. General principles that will be adopted include (but are not limited to) the following; <ul style="list-style-type: none"> o Regular damping down to minimise dust impacts on the adjacent vegetation and waterways. o Phased or stepped approach to contain impacts to discrete working areas at any one time. o Where appropriate the installation of temporary treatment ponds to ensure

¹ The Environment Agency's (2007) Pollution Prevention Guidelines: Works and Maintenance in or Near Water: PPG5. – please note, this document has officially expired, but still contains much relevant information.

Capabilities on project:
Environment

Receptor	Mitigation
	<p>minimum water quality standards throughout construction.</p> <ul style="list-style-type: none"> ○ Timing of works to avoid sensitive periods <ul style="list-style-type: none"> - An appropriate temporary drainage system will be required as part of the CEMP in order to minimise the potential risk of increased sedimentation reaching nearby controlled waters. The temporary drainage system will include settlement ponds of appropriate capacity to allow sediment to settle out before discharge. Temporary run-off settlement ponds are particularly beneficial in that they allow for isolation and on-site treatment of sediment laden surface run-off before release to the natural aquatic environment. Discharge of surface water should be into the ground water rather than into the River (following appropriate SUDs treatment). Alternatively, water from settlement ponds can be removed by tanker for treatment off-site.
<p>Watercourses Operation</p>	<ul style="list-style-type: none"> - Permanent SUDs and settlement ponds will prevent operational pollution from entering the watercourses via surface water runoff. - Bridges and culverts must be used where the operational scheme crosses any watercourse, no matter how small. These culverts will be designed for passage for multiple species (see faunal sections) - The creation and maintenance of a complex riparian zone can reduce the disturbance impact of the proposed scheme and is also aimed at offsetting impacts of habitat loss and fragmentation, particularly associated with culverting. Riparian complexity provides cover for otters and bats, shade and bankside complexity for migratory fish and important allochthonous input for macroinvertebrate shredders. This habitat will be designed by an ecologist in conjunction with a landscape designer.
<p>Protected Species General Construction</p>	<ul style="list-style-type: none"> - Preconstruction surveys will be updated to inform the required protected species mitigation (within 1 year prior to construction) at appropriate seasonal timings, the required licences will be obtained for exclusion and/or translocation and all wildlife legislation will be adhered to. - On site best practice mitigation such as the covering of pits or provision of mammal ramps in all excavations over 0.5m will prevent direct badger and otter mortality on site. - There will be no night time working unless agreed with the local planning authority in advance - Where lighting is required for health and safety reasons it will be directional and low level.
<p>Protected Species General Operation</p>	<ul style="list-style-type: none"> - A range of habitat creation will be required to mitigate for habitat loss, direct mortality due to RTAs, noise and fragmentation. This will be designed to be multifunctional mitigating for fauna, flora and ecosystem services. This habitat will be designed by an ecologist in conjunction with a landscape designer.
<p>Breeding Birds Construction</p>	<ul style="list-style-type: none"> - Should the clearance of vegetation within or adjacent to the development plots be required this will take place outside the bird breeding season (typically March to August inclusive). In the event of clearance being necessary during the bird breeding season, a suitably qualified ecologist will examine the area immediately prior to starting works to confirm likely absence of breeding birds. If nesting birds are found within the affected area, works must be postponed until the juveniles have fledged. This will prevent direct mortality. - A pre-construction survey of all suitable watercourses should be undertaken at least one breeding season in advance of construction following methods outlined by Gilbert et al. (1998) to confirm the potential presence of kingfisher. - Should the presence of kingfisher be confirmed, any river or stream bank that is likely to be directly impacted by the proposed scheme that exhibits potential nesting habitat for kingfisher must be destroyed (only if strictly necessary and under supervision of the ecological clerk of works) or securely covered (which ever is applicable) outside the main breeding season (March – October) at least one year in advance of construction in order to prevent access by potentially breeding kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed.

Capabilities on project:
Environment

Receptor	Mitigation
	<ul style="list-style-type: none"> - Any river or stream bank that is not directly impacted (but is likely to be disturbed) by construction of the proposed scheme that exhibits potential nesting habitat for kingfisher should be securely covered under the supervision of the ecological clerk of works out with the main breeding season (March – October) at least one season in advance of construction in order to prevent access by potentially breeding kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed. - It should be noted that the above mitigation measure cannot be undertaken without taking into consideration indirect impacts (disturbance and pollution) to other ecology, for example, protected mammal species such as otter and freshwater ecology, for example, fish. - Landscape planting (including berry / fruit bearing trees and shrubs) at all junctions (regardless of size), embankments or any point of the proposed scheme that is below vehicle height will be not be planted within 5m of the carriageway to ensure that potential RTAs are minimised as far as practical. -
Breeding Birds Operation	<ul style="list-style-type: none"> - Planting of dense native tree and scrub species (>25m from the carriageway) to screen noise and vibration disturbance associated with operation of the proposed scheme from birds located within adjacent habitats (the screening must ensure that noise levels are maintained less than 40 dBA on the side opposite to the carriageway). - Additional planting within and adjacent to existing areas of woodland/scrub using native scrub and tree species thereby creating additional breeding and foraging bird habitat and compensating for habitat clearance, fragmentation and isolation and disturbance impacts. - Habitat creation should include areas of core woodland (> 30m from woodland edge) and areas located at least 50m from route alignment. - Bird boxes (suitable for a range of species) should be considered (at a density of 20 boxes for every 0.5ha of woodland lost) in severed areas of woodland in order to compensate for the loss of suitable breeding habitat.
Otter Construction	<ul style="list-style-type: none"> - Any works in the vicinity of the waterways (i.e. within 10m) will be preceded by monitoring surveys in respect of otter. - Should any otter lying-up sites be found, then mitigation would have to be adjusted as necessary. The discovery of any holts or couches that are being used for breeding will necessitate the suspension of all works in that area until the cubs have left the holt/couch. - During construction of the road scheme, site compounds and storage or waste dumping facilities must be located at least 30 metres away from any holt/couch or watercourse. - Furthermore, any works within 30m of otter holts will be preceded by monitoring surveys in respect of otter. Works likely to disturb holts with signs of occupation would likely require licensing by Natural England. - The loss of otter holts and couches is difficult to mitigate for and therefore every effort must be made to avoid the destruction of these. Should works be required within 30ms of a holt/couch a licence to carry out the works will have to be obtained prior to development from Natural England.
Otter Operation	<ul style="list-style-type: none"> - Where the road crosses wide rivers and burns (>3m) bridges must be constructed. Bridge design must allow space between the abutments of the bridge and the riverbank to enable otter to pass safely during high water levels. - On all flowing watercourses, culverts designed to a 1:200 flood return period must be used as opposed to cylindrical culverts which fill rapidly so reducing the air space available and making swimming more difficult. Culverts must be as wide as possible and be large enough to allow the incorporation of a dry ledge that is accessible during high water levels. Mammal ledges can be made of solid concrete integral with the culvert or steel that is bolted onto the culvert

Capabilities on project:
Environment

Receptor	Mitigation
	<p>using metal brackets. Ledges must be at least 500mm wide and be accessible both from the bank and the water by the provision of ramps or groups of large boulders. Ledges must be sited at least 150mm above the appropriate high flood level, allowing 600mm headroom.</p> <ul style="list-style-type: none"> - Otter must be guided to the crossing by planting dense scrub on the opposite bank to the ledge.
Water vole Construction	<ul style="list-style-type: none"> - Any works in the vicinity of the waterways (i.e. within 10m) will be preceded by monitoring surveys in respect of water vole. - Should water vole burrows or feeding stations be found destruction of water vole habitat will be required, should this be over a small area habitat manipulation may be used. A conservation licence from Natural England would be required in order to carry out habitat destruction.
Water vole Operation	<ul style="list-style-type: none"> - Operational mitigation for otter will largely mitigate for water vole. Any sheltering habitat lost will be rep
GCN	<ul style="list-style-type: none"> - Any works in the vicinity of suitable terrestrial GCN habitat or ponds will be preceded by monitoring surveys in respect of GCN. - If any breeding habitat or a large amount of terrestrial habitat is to be affected a Natural England exclusion licence and translocation programme would be required - If only small amounts of terrestrial habitat are to be removed operations may be undertaken under Reasonable Avoidance Methods (RAMs) - Destructive searching and two step removal of terrestrial habitat will be undertaken prior to site clearance. - This requires vegetation being strimmed and removed under the supervision of an ecological clerk of works. Removal of vegetation should be undertaken during spring (March-October) when reptiles will be least affected. <ul style="list-style-type: none"> o Prior to strimming any natural/artificial GCN refugia must be removed if possible to an area outside the proposed route. o The first cut must reduce vegetation to a minimum height of 150mm. The strimmed areas should then be left for at least 24 hours so that any GCN present can safely move out of the area. - Using Sustainable Urban Drainage Schemes (SUDS) that retain runoff at source will not be detrimental to amphibians rather it will be beneficial as the features used in this scheme can create amphibian habitats
Reptiles	<ul style="list-style-type: none"> - Above-ground vegetation clearance works and/or ground disturbance works within/near areas of suitable reptile habitat (rough grassland, scrub, woodland edge, rubble piles) pose a risk to legally protected reptile species. - Where the risk to reptiles is assessed by the ecologist as 'high' – on the basis of existing knowledge of reptile populations and/or the quality/extent of reptile habitats within the target site – a full reptile survey and mitigation program may be required/advisable. Such a program would typically involve: <ul style="list-style-type: none"> o a thorough reptile survey (normally undertaken April-September); o identification and/or creation/enhancement of a reptile receptor site; o use of reptile exclusion fencing and the implementation of a capture and translocation program in advance of any site clearance; o final destructive search of site to remove any reptiles persisting following the main capture/translocation program - However it is likely that only small areas of habitat that have been identified as being suitable

Capabilities on project:
Environment

Receptor	Mitigation
	<p>to reptiles that are to be lost or bisected by the road. Where the risk to any reptiles potentially present is assessed by the ecologist as 'low/negligible', precautionary measures may be more appropriate than a full reptile survey/mitigation program. Precautionary measures, which should be undertaken in accordance with a strict ecological method statement, include (but are not limited to):</p> <ul style="list-style-type: none"> ○ demarcation/fencing of area and strict exclusion of all heavy machinery (including tracked plant) until site declared free of reptiles by site ecologist; ○ timing of above-ground vegetation works during hot weather to allow reptiles to escape easily; ○ timing of ground disturbance (including dismantling of spoil/rubble piles) works outside of winter hibernation season (typically October to February inclusive); ○ pre-works hand search by ecologist and/or ecological watching brief during works; ○ dismantling of key hibernation/shelter features, such as rubble piles, tree/hedge root zones, by hand and under watching brief ○ gradual reduction in height of vegetation using handheld tools (strimmers, chainsaws) or tractor mounted flail to 30cm, then 10cm; ○ brash/arising being removed immediately (to avoid creation of temporary habitats) and disposed of or used in habitat creation elsewhere; ○ capture and translocation of reptiles (by experienced ecologist) to suitable habitat <p>- Mitigation proposals prescribed to offset for impacts on other ecological receptors is likely to mitigate for habitat loss on reptiles.</p>
<p>Bats Construction</p>	<ul style="list-style-type: none"> - Direct mortality to be prevented by detailed surveys by bat workers to locate roosts in trees prior to construction. Felling and demolition must take into account findings of examination. If bats are likely to be disturbed, works must cease and advice must be sought from NE including an application for an exclusion licence. - Works compounds, storage sites and access roads must be located at least 30m from roosts and avoid areas of woodland, wetland and scrub to prevent degradation of valuable bat habitat. - No night time working will be undertaken, thereby preventing disturbance, due to lighting and noise, for foraging and commuting bats. Should lighting be required during the winter time in the early morning and late afternoon, lighting would be directional and away from the riparian zone. -
<p>Bats Operation</p>	<ul style="list-style-type: none"> - Road traffic casualties must be avoided by the provision of safe crossing points for bats. Where the road severs flight lines, and in particular where the road is on an embankment, planting will reduce the risk of collision with oncoming vehicles by forcing bats to fly over the top. - Culverts must be at least 1.5 m x 1.5 m in cross section (Brinkmann <i>et al.</i>, 2003) and preferably allow water to flow through and include lead-in structures or planting in order to increase chances of being used by bats. - Where alternative crossing points are provided, tree planting must be positioned to guide bats toward the crossing point. In locations not identified as crossing points, roadside planting must use trees which do not produce nectar or attract insect prey and must be at least 10 m from the road to ensure bats do not try to cross (Lemaire and Arthur, 1999). - Where older trees and those with suitable crevices are to be lost (due to construction and operation phases) they will be replaced.

Capabilities on project:
Environment

Receptor	Mitigation
	<ul style="list-style-type: none"> - Until these tree mature bat boxes will be erected to provide alternative roost sites and offset those to be lost until replacement trees have matured. Bat boxes have been shown to be readily used by the types of species recorded along the survey corridor e.g. Daubenton's bat and pipistrelle species (DMRB 2001). Many more replacement roosts will be needed than the number of trees and buildings to be lost in order to increase the likelihood of being discovered and used by bats and to replace roosts which may be abandoned due to proximity to the road. It is recommended that boxes be installed at a ratio of 4 boxes per tree with roost potential to be replaced. - Bat boxes must be located according to the following criteria in order to increase the likelihood of bats using them: - Boxes must be sited at least 30m away from the proposed scheme to prevent attracting bats to the road. - A mixture of box types must be used to cater for seasonal and species requirements (Mitchell-Jones, 2004). Durable woodcrete (Schwegler) boxes require less maintenance, are longer lived than wooden boxes and offer greater protection against adverse weather conditions (Cowan., 2003). Further surveys to determine species and location may be required to enable species specific bat box mitigation. - Boxes must be sheltered from extreme weather conditions and positioned in a range of different aspects to ensure a range of temperature conditions. - Boxes should be sited in areas where bats feed frequently and should be planned to maximise the chances of bats finding them, for example near existing flight lines. - Obstructions including overhanging vegetation should not restrict access to the roost. There should be at least a 3m clear drop under the box and 1m space in front, above and to the sides. - Boxes must be placed 4-5m above the ground to avoid disturbance including vandalism and taking into account that boxes will need to be monitored. - Provision of nursery roosts and hibernacula is particularly important as they are harder to find. - Habitat fragmentation will be offset by the provision of vegetation along verges and embankments to establish connectivity of landscape features for bats. Habitat creation must aim to fill in existing gaps in linear vegetation features and new areas of woodland must adjoin existing blocks or act as stepping stones between neighbouring woods or connecting tree lines (Entwistle et al., 2001) - The level of and provision of lighting including roadside and works must be kept to a minimum according to BS 5489 and the ILE Guidance for the Reduction of Obtrusive Light (The Institution of Lighting Engineers, 2011). Low pressure sodium lamps must be used in preference to high pressure sodium or mercury lamps and the brightness must be kept as low as possible by directing the beam downwards using hoods and limiting the height of lighting columns
Badger Construction	<ul style="list-style-type: none"> - No night-time working or traffic movements (other than light vehicles) will be allowed on the site at night where badger setts are located within 100m of the works area or where badgers could be injured or killed by heavy plant or other machinery. - No steep-sided, deep and/or water-filled excavations into which badgers could fall and become trapped will be left uncovered overnight. Any major excavations that need to be left uncovered overnight will have their slopes battered to a slope no steeper than 50°. - If it is necessary to leave small deep, steep-sided or water-filled excavations open overnight they will be fenced with suitable badger-proof fencing. - Any badger setts within 50m of any works area will be made known confidentially to contractors in order to ensure that they are not accidentally disturbed or destroyed during

Capabilities on project:
Environment

Receptor	Mitigation
	<p>construction. Undisturbed access to these areas will also be provided throughout construction.</p> <ul style="list-style-type: none"> - Contractors will be alerted to the importance of maintaining confidentiality with regards to locations of badger setts. - Supervision and guidance on working near badger setts will be provided by the ECoW. - Where the location of an active badger sett conflicts with the siting of construction works, the badger sett will be avoided. Where this is not possible, a sett exclusion and closure procedure will be carried out. Sett exclusions will take place between 1 July to 1 December inclusive to avoid times of year when badger cubs may be dependant and underground. Exclusions will take place using prescribed methods, in consultation and under licence from Natural England.
<p>Badger Operation</p>	<ul style="list-style-type: none"> - Badger underpasses will be installed if necessary at strategically important locations along the scheme (i.e. where existing badger pathways have been identified) in order to allow badgers to safely cross under the new road and continue to use their current territories. As a general rule, it is recommended that at least two underpasses are provided per social group (Highways Agency, 2001). Underpasses will comply with current DMRB standards comprising concrete pipes (minimum 900mm diameter if the underpass is less than 50m in length, and a minimum of 1050mm diameter if the underpass is greater than 50m in length) sited to be easily found by badgers and designed so that they will not become water logged. Where it is necessary to site underpasses away from an existing badger path, every effort will be made to minimise the length of detour required, preferably to no more than 250m (Highways Agency, 2001). It can be difficult to persuade badgers to use underpasses even where they are sited on existing pathways. However, scent trails of bedding and dung from the social group in question as well as syrup and peanuts can be used to encourage badgers through tunnels, (Harris et al., 1994). The length of underpasses will be kept to a minimum, in order to facilitate their use by badgers.

Appendix 1.9

Suffolk County Council Drawing- A12 Four Villages and Sizewell

