

Saltend Power Station – Ecological Air Quality Assessment (Reassessment July update)

Bureau Veritas

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Contents

Executive Summary	4
1. Introduction	5
1.1 Background	5
1.2 Previous Assessment	5
2. The Humber Estuary	6
2.2 Humber Estuary SAC	6
2.3 Humber Estuary SPA	6
2.4 Identified receptors and Environmental Benchmarks.....	7
3. Results.....	8
3.2 Annual Mean NO _x	8
3.3 Daily Mean NO _x	8
3.4 Acid Deposition.....	8
3.5 Nitrogen Deposition	9
3.6 In-combination Assessment	11
4. Conclusions.....	13
References.....	14
Figures 1 - 4.....	15

Executive Summary

Cura Terrae Land and Nature Ltd (Cura Terrae) were commissioned by Bureau Veritas in March 2025 to provide a robust ecological assessment of the potential effects of the proposed permit at Saltend Power Station. This assessment concluded further assessment was required with modelling of nitrogen deposition beyond the 2 km Zone of Influence required. This report details the results of the updated scenario provided by Bureau Veritas on 7th July 2025.

This report details the findings of the ecological assessment to determine whether there are habitats which form part of the Humber Estuary site designations with pollutant exceedance and provide a quantification of area of habitat which may be potentially degraded by such an exceedance.

The reassessment concludes annual and daily mean NO_x and acid deposition are below the threshold for significance and no likely significant effect is anticipated on the Humber Estuary SAC/SPA from these pollutants.

Nitrogen deposition levels exceed the lower critical load due to high background levels. 1.25 % of the total area of mudflat within the Humber Estuary SAC and SPA will be affected by an increase in over 0.1 kgN/ha/yr because of the proposed permit. Given the small area above 1% of the total SAC/SPA and environmental conditions of the Humber Estuary limiting the potential for atmospheric nitrogen to accumulate, no likely significant effect is anticipated.

For the remaining sensitive habitat less than 1% of the total area within the SAC/SPA will be impacted by increases in nitrogen deposition. Whilst background concentrations are high and above lower critical loads, these values demonstrate that only a very small proportion of each habitat type is affected by the proposed permit and is not considered significant.

No other plans or projects were identified within the 4 km Zone of Influence. Therefore, no in-combination effects are anticipated.

The assessment concludes that no alone or in-combination effects on the Humber Estuary SAC/SPA from the proposed permit are anticipated.

1. Introduction

1.1 Background

- 1.1.1 Cura Terrae Land and Nature Ltd (Cura Terrae) were commissioned by Bureau Veritas in July 2025 to provide a robust ecological assessment of the potential effects of the proposed permit at Saltend Power Station (the Site) on the National Site Network (NSN) sites.
- 1.1.2 Under the Conservation of Habitats and Species Regulations 2017 (as amended), consideration must be taken on whether a plan or project, alone or in combination with other plans or projects, is likely to have a significant effect on a NSN site.
- 1.1.3 The assessment was required to determine the potential for Likely Significant Effects arising from the proposed permit, both alone and in-combination within the Humber Estuary Special Areas of Conservation (SAC) and Special Protection Area (SPA).
- 1.1.4 This report details the findings of the ecological assessment to determine whether there are habitats which form part of the Humber Estuary site designations with pollutant exceedance and provide a quantification of the area of habitat which may be potentially degraded by such an exceedance.
- 1.1.5 This assessment is based on air quality modelling data provided by Bureau Veritas on 7th July 2025.

1.2 Previous Assessment

- 1.2.1 Cura Terrae were previously commissioned by Bureau Veritas in March 2025 to provide a robust ecological assessment of the potential effects of the proposed permit at Saltend Power Station. It concluded that the proposed works affects less than 1 % of each sensitive habitat type however uncertainty remained about the distance at which nitrogen deposition returned to background levels and further assessment was required.
- 1.2.2 Further air quality modelling of nitrogen deposition beyond the 2 km Zone of Influence was required. This reassessment provides an updated scenario within a 4 km Zone of Influence.

2. The Humber Estuary

- 2.1.1 The Humber Estuary is a large macro-tidal coastal plain estuary with associated mudflats, sandflats, saltmarsh and reedbeds. The Humber Estuary is designated as a Special Area of Conservation (SAC) and Special Protection Area (SPA). The Humber Estuary is also designated as a site of special scientific interest (SSSI).
- 2.1.2 Under the Conservation of Habitats and Species Regulations 2017 (as amended), consideration must be taken on whether a plan or project, alone or in combination with other plans or projects, is likely to have a significant effect on a NSN site. The Humber Estuary SAC and SPA will form the focus of this assessment.

2.2 Humber Estuary SAC

- 2.2.1 The Humber Estuary SAC is designated for the following Annex 1 habitats:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons
- Dunes with *Hippophae rhamnoides*
- Embryonic shifting dunes
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Fixed dunes with herbaceous vegetation (‘grey dunes’)
- *Salicornia* and other annuals colonising mud and sand
- Sandbanks which are slightly covered by sea water all the time
- Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’)

- 2.2.2 **Estuaries and mudflats and sandflats not covered by seawater at low tide** are the primary reason for designation.

2.3 Humber Estuary SPA

- 2.3.1 The Humber Estuary SPA is designated for the following Annex 1 species:

- Avocet *Recurvirostra avosetta*
- Bar-tailed godwit *Limosa lapponica*
- Bittern *Botaurus stellaris*
- Golden plover *Pluvialis apricaria*

- Hen harrier *Circus cyaneus*
- Little tern *Sterna albifrons*
- Marsh harrier *Circus aeruginosus*
- Ruff *Philomachus pugnax*

2.3.2 The SPA also qualifies due to its assemblage of waterbirds and due to the following regularly occurring migratory species:

- Black-tailed godwit *Limosa limosa*
- Dunlin *Calidris alpina*
- Knot *Calidris canutus*
- Redshank *Tringa tetanus*
- Shelduck *Tadorna tadorna*

2.4 Identified receptors and Environmental Benchmarks

2.4.1 The Humber Estuary has overlapping designations as a SAC and SPA, being the only designated site located within 4 km of the Site and thus form the focus of this assessment. The Humber Estuary covers a large area, the section and associated habitats relevant to this report is as shown in **Figure 1**.

2.4.2 Habitat of Principal Importance (HPI) within the Humber Estuary have been mapped from the Priority Habitat Inventory (England)¹. HPIs identified within the receptor area are:

- Coastal saltmarsh;
- mudflats; and
- reedbeds.

2.4.3 Mudflats and coastal saltmarsh are included in the list of Annex 1 habitat the SAC is designated for. In addition, mudflats form the primary reason for designation of the SAC. Reedbeds are not a designated feature of the SAC.

¹<https://www.data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitats-inventory-england> -
– Accessed July 2025

3. Results

- 3.1.1 Air quality modelling data for this assessment was provided by Bureau Veritas. The results of the ecological assessment for each pollutant are detailed below.
- 3.1.2 For this reassessment Bureau Veritas has increased the Zone of Influence of the proposed permit to 4 km.
- 3.1.3 The relevant critical load and level for each pollutant is detailed below.
- 3.1.4 Following the precautionary principal, the assessments have been undertaken with reference to the lower critical load or level to ensure the potential effects are considered fully.

3.2 Annual Mean NO_x

- 3.2.1 The process contributions (PC)² and predicted environmental contributions (PEC)³ for annual mean NO_x at all modelled receptors are below the Air Quality Assessment Level (AQAL) of 30 µg/m³. The highest PEC was 17.01 µg/m³ at receptor E3, equating to 56.70 % of the AQAL.
- 3.2.2 Annual mean NO_x levels are below the threshold for significance and no likely significant effect is anticipated on the Humber Estuary SAC/SPA.

3.3 Daily Mean NO_x

- 3.3.1 Daily mean NO_x concentration at the modelled receptors are higher than the annual mean levels across all receptors. The highest was recorded at receptor E3 reaching PECs of 73.91 µg/m³ equating to 98.56 % of the daily AQAL (75 µg/m³).
- 3.3.2 While this value approaches the threshold, it does not exceed it. Given the short-term nature of daily exceedances and all PECs remaining below the AQAL, no likely significant effect is anticipated on the Humber Estuary SAC/SPA.

3.4 Acid Deposition

- 3.4.1 Air Pollution Information System (APIS), critical loads for acid deposition are not defined for coastal saltmarshes, mudflats, or estuarine habitats due to their low sensitivity. Reedbeds, which

² This refers to the amount of pollutant deposited from a specific source or process. It represents the direct contribution of pollutant from the Site to the environment.

³ This is the total concentration of pollutant in the environment, combining both the process contribution (PC) and the background concentration already present in the environment.

may occur in more brackish or freshwater-influenced areas, can exhibit moderate sensitivity to acid deposition and therefore a critical load of 20 keq/ha/yr has been applied for the assessment.

- 3.4.2 The highest sulphur PEC was 0.34 keq/ha/yr (at E4), compared to a critical load of 20 keq/ha/yr. Similarly, nitrogen PECs ranged from 1.07 to 2.14 keq/ha/yr, also below the critical load of 20 keq/ha/yr. These results indicate that the proposals are unlikely to contribute to acidification of the Humber Estuary SAC/SPA and no likely significant effect is anticipated.

3.5 Nitrogen Deposition

- 3.5.1 The results of the atmospheric dispersion modelling assessment for nitrogen deposition demonstrate that the implementation of Saltend works alone is predicted to result in an increase in nitrogen deposition (Table 1).
- 3.5.2 The current background nitrogen deposition at the site is 14.98 kgN/ha/yr. The critical load range relevant to all sensitive habitats for this pollutant is 10 – 20 kgN/ha/yr. A critical load for mudflats is not defined by APIS, however it states mudflats are nitrogen sensitive and a 10 kgN/ha/yr precautionary limit has been applied.
- 3.5.3 PEC values are significantly higher than the minimum critical load (10 kgN/ha/yr) for all receptors and the predicted total nitrogen deposition rates at all receptors, in each scenario, are predicted to exceed the respective critical load ranges due to existing levels of deposition across the Humber Estuary.
- 3.5.4 The highest PC at the modelled receptors is 1.55 % of the lower critical loads indicating a likely significant impact from the permit alone. Further assessment on nitrogen deposition is therefore required and considered below.

Table 1. Results of nitrogen deposition atmospheric modelling assessment

Receptor	Background Nitrogen deposition (kgN/ha/yr)	PEC (kgN/ha/yr)	% PEC of critical load	PC (kgN/ha/yr)	% PC of critical load
E1	14.98	14.98971936	149.90%	0.009719357	0.10%
E2	14.98	15.04844723	150.48%	0.06844723	0.68%
E3	14.98	15.13493697	151.35%	0.154936974	1.55%
E4	14.98	15.06762084	150.68%	0.087620839	0.88%

- 3.5.5 Using data received from Bureau Veritas, nitrogen deposition contour maps have been created to establish the area of sensitive habitat within the SAC/SPA impacted by the increased nitrogen deposition. The modelled area covers the 4 km extent of the Zone of Influence as indicated by the site extent boundary (**Figure 1**).
- 3.5.6 Due to existing high levels present the PC has been mapped to indicate the change from the proposed works.
- 3.5.7 To determine significance to designated sites Natural England guidance applies a screening criterion of >1 % of the lower critical load. Anything below 1 % of the environmental benchmark has been screened out as it is so small that it is not likely to be perceptible and significant.
- 3.5.8 As can be seen in **Figure 2** most of the modelled areas of coastal saltmarsh, mudflats and reedbeds within the SAC/SPA will be affected by an increase in over 0.1 kg/ha/yr (1% of the critical load). Likely significant effects arising from nitrogen deposition on these habitats cannot be ruled out and further assessment is required.
- 3.5.9 Further spatial analysis (**Figure 3**) has been undertaken to determine the area of sensitive habitats impacted within the Humber Estuary SAC/SPA.
- 3.5.10 The total area of the modelled data for each sensitive habitat type where critical loads are expected to be exceeded is detailed in Table 2. The total extent of the impact in the context of the whole SAC/SPA is shown in **Figure 4**.

Table 2. Area (m²) of sensitive habitat types affected by Nitrogen Deposition over 1% within modelled area.

Sensitive Habitat	Area (m ²) within full SAC/SPA	Area (m ²) within SAC/SPA affected by Nit Dep >0.1	Percentage
Coastal saltmarsh	19,095,754.22	56,882.15	0.30%
Mudflats	640,372,50.42	800,599.88	1.25%
No main habitats but additional habitats present	29,973,816.75	7,271.61	0.02%
Reedbeds, coastal saltmarsh	3,259,686.96	1,754.24	0.05%

- 3.5.11 The modelled area indicates that 1.25 % of the area of mudflat within the SAC/SPA will experience an increase in nitrogen deposition as a result of the proposed permit. Mudflats form the primary reason for designation of the SAC and is considered further below.
- 3.5.12 For the remaining sensitive habitat less than 1% of the total area within the SAC/SPA will be impacted. In addition, reedbeds are not a designated feature of the SAC. Whilst background concentrations are high and are above lower critical loads, these values demonstrate that only a very small proportion of each habitat type is affected. This is not considered significant and not considered further in this report.

Nitrogen Deposition impact on Humber Estuary mudflats

- 3.5.13 1.25 % of the total area of mudflat within the Humber Estuary SAC and SPA will be affected by an increase in over 0.1 kgN/ha/yr (1% of the critical load) as a result of the proposed permit.
- 3.5.14 The Humber Estuary is large macro-tidal coastal plain estuary with regular and substantial flushing with brackish water. The hydrodynamic regime significantly limits the potential for atmospheric nitrogen to accumulate within the mudflat substrate. The contribution of atmospheric nitrogen is expected to be significantly lower than the contribution from waterborne nutrient input. In addition, the Site Improvement Plan⁴ for the Humber Estuary identifies waterborne nutrient inputs as a key pressure on mudflat habitat and atmospheric nitrogen deposition is listed as a priority issue for dune habitats only. This indicates atmospheric nitrogen is not considered a key pressure on mudflat habitat within the Humber Estuary.
- 3.5.15 Whilst the area slightly exceeds the 1% screening threshold typically used to identify likely significant effects, the specific environmental conditions at the Site suggest the proposals are unlikely to result in further impact from nitrogen deposition on the Humber Estuary SAC/SPA. On this basis, no likely significant effect is anticipated.

3.6 In-combination Assessment

- 3.6.1 Under the Conservation of Habitats and Species Regulations 2017 (as amended), consideration must be taken on whether a plan or project, alone or in combination with other plans or projects, is likely to have a significant effect on a European site.

⁴ <https://publications.naturalengland.org.uk/file/5730884670980096>

- 3.6.2 Bureau Veritas conducted a planning search of projects and plans within 4 km of the Zone of Influence of the proposed permit to identify any proposals that could result in an in-combination effects.
- 3.6.3 No other plans or projects were identified. The Saltend proposal will not result in any further likely significant effects on the Humber Estuary SAC/SPA when considered in combination with other plans or projects.

4. Conclusions

- 4.1.1 A detailed air quality assessment has been completed to consider the potential impacts of the proposals at Saltend Power Station on potentially sensitive ecological designated sites within the Humber Estuary SAC and SPA.
- 4.1.2 Annual and daily mean NO_x and acid deposition are below the threshold for significance and no likely significant effect is anticipated on the Humber Estuary SAC/SPA from these pollutants.
- 4.1.3 Nitrogen deposition levels exceed the lower critical load due to high background levels. 1.25 % of the total area of mudflat within the Humber Estuary SAC and SPA will be affected by an increase in over 0.1 kgN/ha/yr as a result of the proposed permit. Given the small area above 1% of the total SAC/SPA and environmental conditions of the Humber Estuary limiting the potential for atmospheric nitrogen to accumulate, no likely significant effect is anticipated.
- 4.1.4 For the remaining sensitive habitat less than 1% of the total area within the SAC/SPA will be impacted by increases in nitrogen deposition. Whilst background concentrations are high and above lower critical loads, these values demonstrate that only a very small proportion of each habitat type is affected and is not considered significant.
- 4.1.5 No other plans or projects were identified within the 4 km Zone of Influence. Therefore, no in-combination effects are anticipated.
- 4.1.6 The assessment concludes that no alone or in-combination effects on the Humber Estuary SAC/SPA from the proposed permit is anticipated.

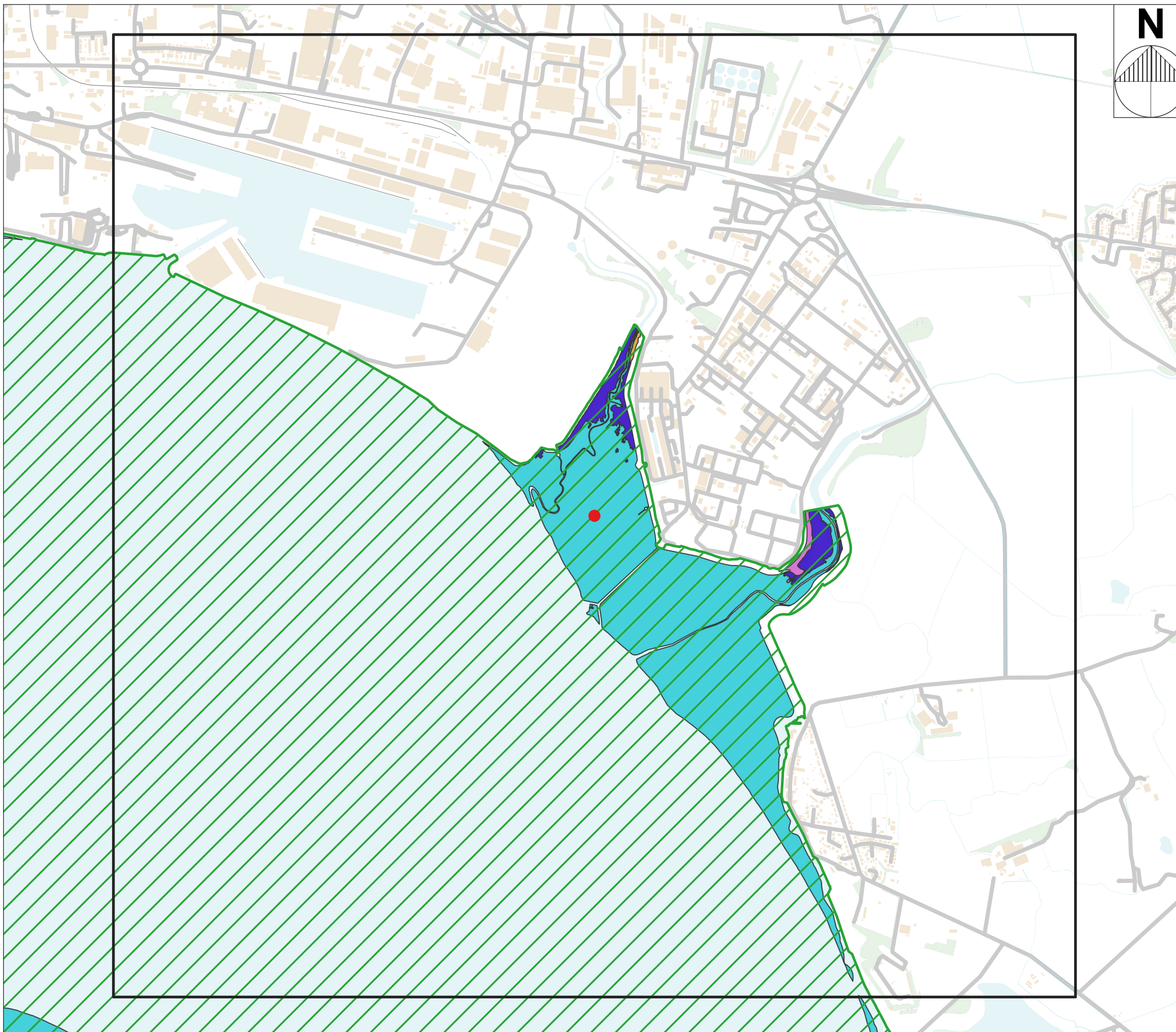
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Natural England (2018). Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations. Version: June 2018. Natural England, York. Available at: <https://publications.naturalengland.org.uk/publication/4720542048845824>

UK Centre for Ecology & Hydrology (UKCEH). (n.d.). *Site Relevant Critical Loads (SRCL) Tool*. Air Pollution Information System (APIS). Available at: <https://www.apis.ac.uk/srcf>

Figures 1 - 4.



Key

 Humber Estuary Special Area of Conservation and Special Protection Area

Priority Habitat Inventory within Humber Estuary SAC/SPA:

 Coastal saltmarsh

 Mudflats

 No main habitat but additional habitats present

 Reedbeds, Coastal saltmarsh

0 200 400 600 800 1,000 m






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Figure 1
Humber Estuary SAC/SPA with PHI

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Site centred on:		TA 15978 27278	



Key

- Receptors Exceeding 1% of Lower Critical Load for Annual Mean Nitrogen Deposition
 -  Humber Estuary Special Area of Conservation and Special Protection Area
- Priority Habitat Inventory within Humber Estuary SAC/SPA, affected by Nitrogen PC over 1% of LCL:
-  Coastal saltmarsh
 -  Mudflats
 -  No main habitat but additional habitats present
 -  Reedbeds, Coastal saltmarsh



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Figure 2
Humber Estuary SAC/SPA with PHI containing
receptors with Nitrogen PC over 1% of Lower Critical
Load





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Key

- Isopleth Contours
-  Humber Estuary Special Area of Conservation and Special Protection Area

Priority Habitat Inventory within Humber Estuary SAC/SPA, affected by Nitrogen PC over 1% of LCL

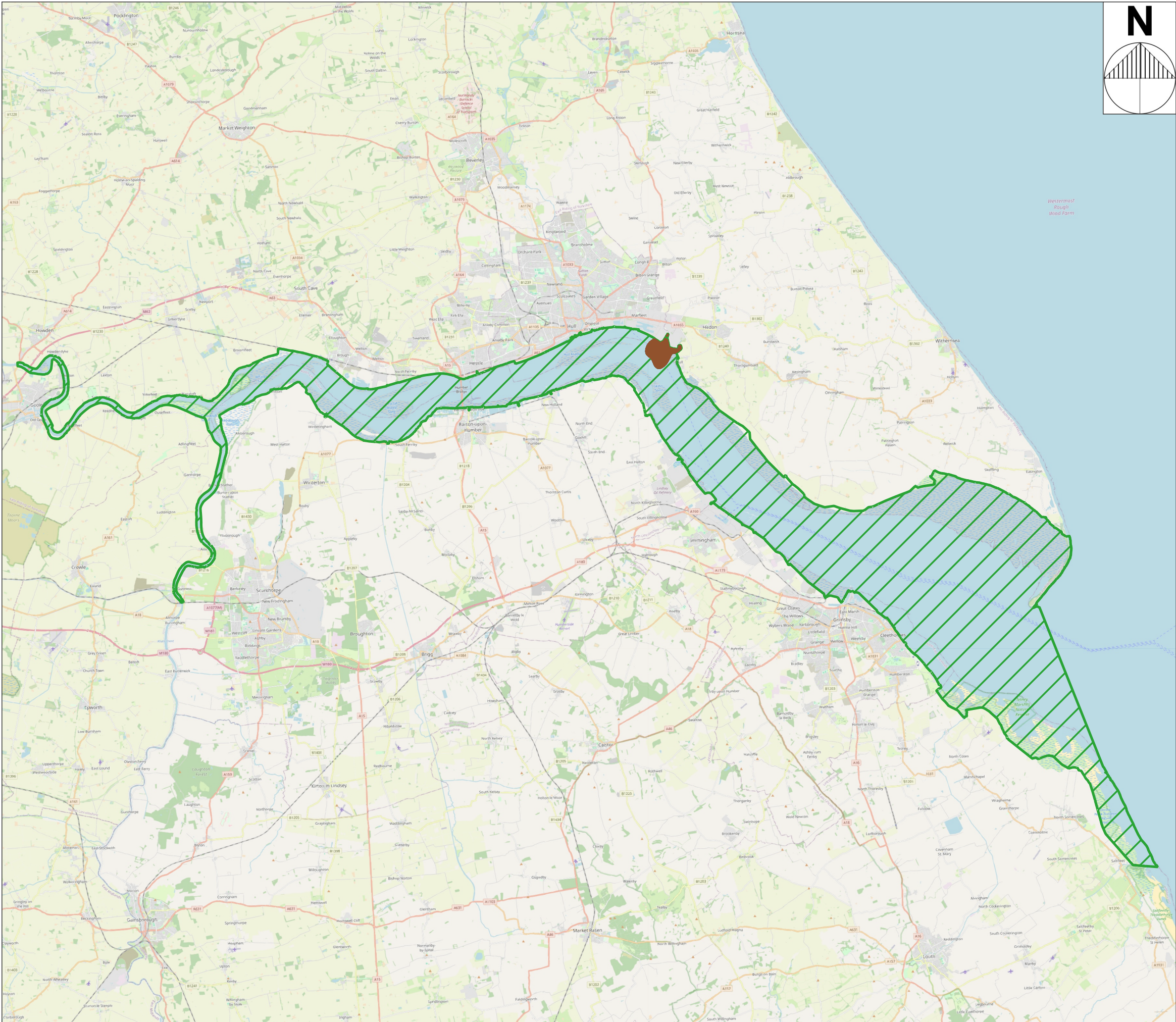
-  Coastal saltmarsh
-  Mudflats
-  No main habitat but additional habitats present
-  Reedbeds, Coastal saltmarsh



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Figure 3
Humber Estuary SAC/SPA, PHI, and Isopleth Map
of Nitrogen Deposition Values

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Site centred on:		TA 15978 27278	



Key

- Area with Receptors Exceeding 1% of Lower Critical Load for Annual Mean Nitrogen Deposition
- Humber Estuary Special Area of Conservation and Special Protection Area

0 3,000 6,000 9,000 12,000 15,000 m

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Figure 4
Humber Estuary SAC/SPA and Area with receptors
with Nitrogen PC over 1% of Lower Critical Load

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Site centred on:		TA 15978 27278	