



Land East of Fathom's Reach, Hayling Island

Nitrogen Budget Calculation

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Report	Nitrogen Budget Calculation
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Executive Summary

Ecosupport Ltd was instructed by Taylor Wimpey Southern Counties to conduct a Nitrogen Budget Calculation for a site called 'Land East of Fathom's Reach' in Hayling Island, in order to determine if the site will achieve nitrogen neutrality or will result in an increased nitrogen load, which requires mitigation.

Using the standard Natural England methodology, it was calculated that the site will result in an increased nitrogen load of **57.16kg/year** and will therefore require mitigation.

Recommendations for mitigation are outlined within **Section 4.0** of this document. Mitigation must be agreed with the local authority to be considered acceptable.

1.0 INTRODUCTION

1.1 Brief

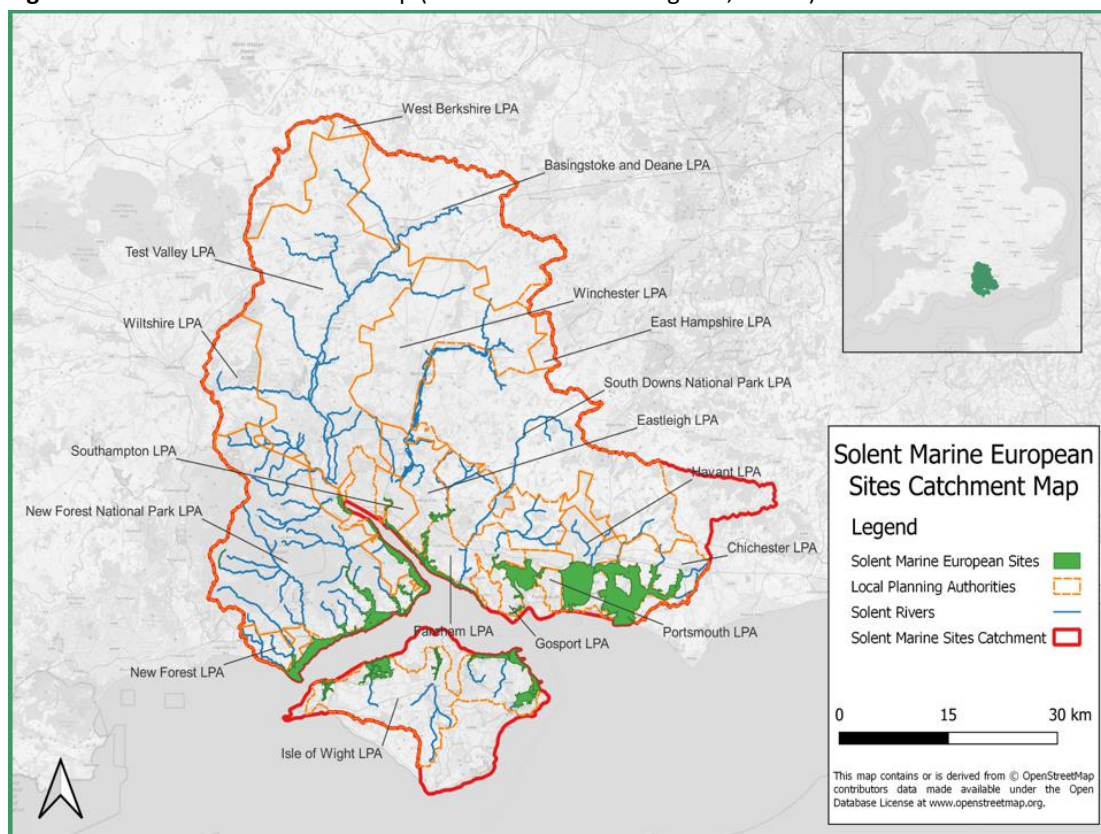
Ecosupport Ltd was instructed by Vivid Homes to conduct a Nitrogen Budget Calculation for a site called 'Land East of Fathom's Reach' in Hayling Island. Due to the site's location within the Solent Catchment Area, it will require nitrogen neutrality to ensure the development will not result in an increased nitrogen load into the Solent's sensitive and designated areas.

The purpose of this calculation was to determine the change in nitrogen load resulting from a net increase in dwellings and change of land use within the site as a result of the development.

1.2 Background

The Conservation of Habitats and Species Regulations (2019) transposes the EU Habitats Directive (Council Directive 92/43/EEC) into UK domestic law and provides protection for sites and species deemed to be of conservation importance across Europe. Under Regulation 63 competent authorities must undertake an "Appropriate Assessment" to assess whether proposed actions may have a significant effect on a European protected site.

In 2018 and 2019, Natural England undertook a number of condition assessments on designated sites around the Solent including the Solent Maritime Special Area of Conservation (SAC), Chichester and Langstone Harbours Special Protection Area (SPA), Portsmouth Harbour SPA and Solent and Southampton Water SPA and associated Sites of Special Scientific Interest (SSSI). The assessment found that many of the designated sites were in unfavourable and/or declining conditions due to existing levels of nutrients and held the view that increased wastewater from new developments would have a likely significant effect on the internationally designated sites. Natural England advised councils within the watersheds leading to the designated sites (**Fig 1**) that any new development resulting in an increase in overnight stays including should achieve nutrient neutrality in order to not have any significant effects. Natural England developed a nitrogen budget methodology to calculate the nitrogen output of a developing using a precautionary approach. All developments that will result in a net increase in dwellings or overnight stays (e.g. hotels, student accommodation, nursing homes) will require a nitrogen budget calculation using this method. Any sites resulting in an increase in nitrogen loading will require mitigation prior to planning approval, or site occupancy, where Grampian conditions are permitted to achieve planning approval.

Figure 1. Solent Catchment Area map (taken from Natural England, 2022b)

1.3 Site Location

The site comprises a parcel of land supporting scattered trees, scrub and unmanaged grassland located to the east of Fathom's Reach, Hayling Island, PO11 0RR (centred on OS grid reference SZ 716 996) (**Fig 2**).

Figure 2. Redline location plan of the site.

1.4 Current Land Use

The total area of site is 1.78ha in size (4.40 acres). The current land use of the site is largely greenfield comprising 1.66ha, with habitats including poor semi-improved grassland, tall herb, scrub, tree lines/hedgerows, and scattered trees. In addition, there is 0.12ha existing urban area associated with the hard standing path and the existing residential dwellings at the west of site.

1.5 Proposed Development & Land Use

The proposed development will entail conversion of the land use to primarily urban with 51 residential dwellings and associated gardens, roads and landscaping covering 1.56ha of area (Fig 3). In addition, 0.22ha will be converted to green space / ecology area.

While 51 dwellings will be constructed, there are 5 existing dwellings that will be demolished for the development. Therefore, the net increase in dwellings is 46.

Figure 3. Proposed development showing site layout

2.0 METHODOLOGY

2.1 Calculation

The methodology for the assessment of the net change in nitrogen to the Solent catchment is based on the updated Natural England's advice on achieving nitrogen neutrality (Natural England 2022a) and their associated published *Nitrogen Budget Calculator Version 2* (Natural England 2022b). As recommended, only the expected area to be impacted for change in land use is calculated. There are four stages to the calculation.

Stage 1 calculates the new nutrient load associated with the additional wastewater that would exit the wastewater treatment works (WwTW) into the Solent. It allows entering the average household size, the default setting is the national occupancy rate of 2.4 people per dwelling/unit, only changed if there is sufficient evidence that the development will be different to the national average. and it is assumed that the water use is 120L/day per person. In addition, it assumes a 90% discharge of the total nitrogen permit limit of the WwTW. In the case a WwTW does not have a permit limit, a worst-case scenario of 27mg/L is used.

Stage 2 calculates the existing nitrogen load from current land use based on set average nitrogen loss rates from type of land use. In this section some environmental information about the development is also entered as well as the type(s) and area(s) of landcover on the development site. Stage 3 similarly calculates the annual nitrogen load from the proposed land use based on the proposed site plan.

Stage 4 calculates calculate the net change in nutrient loading for the site and the final annual nutrient budget for the development site. The value(s) shown are how much nutrient mitigation is required in kilograms per year to achieve nutrient neutrality.

3.0 RESULTS

3.1 Nitrogen Budget

The proposed development will result in **57.16kg of Total Nitrogen per year**. See **Table 1** below for full details.

Table 1. Nitrogen Budget Calculation using Natural England (2022b) calculator

Stage 1		
User Inputs		
Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	120	
Development Proposal (dwellings/units):	46	
Include deductible acceptable loading?	Yes	
Wastewater treatment works:	Budds Farm WwTW	
Wastewater treatment works N permit (mg TN/litre):	7.7	
Stage 1 Calculated Loading		
Stage 1 Nutrient Loading		
Additional population	110.4	people
Wastewater by development	13248	litres/day
Annual wastewater TN load	33.53	kg TN/yr

Stage 2

User Inputs

Catchment:	
Soil drainage type:	Naturally wet
Annual average rainfall (mm):	675.1 - 700
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	Area (ha)	Annual nitrogen nutrient export (kg TN)
Residential urban land	0.12	1.53
Greenspace	1.66	4.98
Total:	1.78	6.51

Stage 3

User Inputs

New land use type(s)	Area (ha)	Annual nitrogen nutrient export (kg TN)
Residential urban land	1.56	19.95
Greenspace	0.22	0.66
Total:		1.78
		20.61

Stage 4

Calculated Outputs

Annual Nutrient Budget

The total annual nitrogen load to mitigate is:

57.16 kg TN/year

4.0 MITIGATION

4.1 Introduction

The below sections outline a number of mitigation options to offset the increased nitrogen load. The following mitigation options are based on Natural England (2022a) advice and the approaches by the local authority. Any mitigation will have to be agreed with the local authority in order to achieve nutrient neutrality and a combination of strategy options may be used.

4.2 On-site options (typically larger sites only)

4.2.1 Re-arrange site layout

The preferred mitigation option is to mitigate within the site. For large sites, it may be possible to change the site layout to include more open space or reduce the number of new dwellings to avoid an increase in nutrient loading. However, for this site it would not be possible to entirely mitigate the increase using this method due to the existing habitat type as largely greenfield.

4.2.2 Habitat creation

In addition, there may be an opportunity to include habitat creation such as creation of wetlands or ponds within the site. This may be part of a sustainable urban drainage (SUDs) system. To include this method, consultation with Natural England and/or the local authority will be required to agree on the actions to be taken to offset the nitrogen load.

4.3 Off-site offsetting

4.3.1 Land use change

Nutrient neutrality can also be reached by changing the land use in perpetuity of another area to offset the nitrogen increase on this site. This may be achieved by purchasing an agricultural land and converting to conservation habitat, or by arranging a legal agreement with another landowner to convert the land use in perpetuity. The land must be appropriately secured for long-term benefit.

The amount of offsite land to be converted to green space (e.g. woodland, heathland, wetland, conservation grassland etc.) is partially dependent on the current land use. Typically, agricultural land will be converted as agriculture has the highest nitrogen leaching rates and therefore the greatest amount of decrease by converting to another use. In **Table 2** below is the estimated amount of land requiring conversion to offset the site, based on the nitrogen leaching rates provided by Natural England (2022b).

Table 2. Area of agricultural land requiring conversion for offsetting 57.16kg/yr based on land use

Existing agricultural land use	Area requiring conversion
Cereals	2.18ha
Dairy	1.83ha
General Cropping	2.80ha
Horticulture	2.36ha
Pig Farming	0.87ha
Lowland Grazing	7.15ha
Mixed	2.45ha
Poultry Farming	0.87ha

4.3.2 Community habitat creation

For smaller sites, there may be opportunities for actions within the community to offsite nitrogen such as creation of local ponds, wetlands, hedges among others. The local authority may be able to advise on if there are any appropriate mitigation needs within the community.

4.4 Nitrogen mitigation credits

Another mitigation opportunity is through the developing nitrogen credit schemes being developed.

There are third-party credit schemes being developed through the UK government and Hampshire and Isle of Wight Wildlife Trust (HIWWT) as well. HIWWT have begun pilot projects for nitrate offsetting credits that may be purchased that will enable the long-term offset of nitrogen and increased habitat (HIWWT, 2020 & Defra et al, 2020).

Within Havant Borough Council, the council has recently updated the developed position statement and mitigation plan (Havant Borough Council 2022). Within this plan, they have developed offsite mitigation options through the Warblington Farm Mitigation Scheme. Financial contributions are in place at a rate of £1,308.00 per kilo contribution (May 2022), with expected annual increases. This option would be secured directly with the council.

5.0 REFERENCES

- Defra, Natural England, Ministry of Housing, Communities & Local Government, Rebecca Pow MP & The Rt Hon Christopher Pincher MP (2020). *Wildlife Protection plan to unlock Hampshire housebuilding*, 11 September 2020. Accessed at https://www.gov.uk/government/news/wildlife-protection-plan-to-unlock-hampshire-housebuilding?fbclid=IwAR2I20gohvbt1QApCNGNklEdhy9ZDHtrK5X_YJIV8dH1KgJvG90R2SfvSs
- Havant Borough Council (2022). Position Statement and Mitigation Plan for Nutrient Neutral Development. August 2020 (updated May 2022). Available at: https://cdn.havant.gov.uk/public/documents/Position%20statement%20and%20mitigation%20plan_0.pdf
- HMSO (2019) The Conservation of Habitats and Species Regulations. Statutory Instrument 2019 No. 579. HMSO, London.
- Natural England (2022a) *Advice for development proposals with the potential to affect water quality resulting in adverse nutrient impacts on habitats sites*. – 16 March 2022
- Natural England (2022b) *Nitrogen Budget Calculator April 2022*.