Building a Better Future Plan - Representation Form

Part A - Personal Details

Please indicate whether you are completing this form yourself or if you are an agent completing this on behalf of a client
I am completing this form myself

Part A - Personal Details (Completing form on own behalf)

Please provide the following personal details. Please note that these details are required for all representations and your information will be shared with the Planning Inspectorate. The personal data you provide will be used to ensure that representations comply with government guidance and that they can be used as part of the Local Plan examination process. More information on how we use your personal information can be found as part of the 'Planning Policy' privacy notice is available here.

Title	Dr.
First Name	David
Last Name	Mason

[redacted]

Please provide the following details where applicable and/or relevant
No Response

Part A - Personal Details (Agent on client's behalf)

If an agent is appointed, please provide the following information: Please note that these details are required for all representations and your information will be shared with the Planning Inspectorate. The personal data you provide will be used to ensure that representations comply with government guidance and that they can be used as part of the Local Plan examination process. More information on how we use your personal information can be found as part of the 'Planning Policy' privacy notice is available here.
No Response

Please provide the following information about the client for whom you are completing this form on their behalf
No Response

Part B - Your representation(s)

Which part of the Building a Better Future Plan does your representation relate to?
Please provide as much detail as possible.
If you wish to make a change to the Policies Map, please comment on the corresponding p olicy, and explain what change you would wish to make. If you would be helpful if you could show this in visual form
A full list of policies and allocations can be found in the contents page(s) of the Publication Plan - you can access this document here.

Policy Number	-
Allocation Number	2
Paragraph Number	-
Page Number	95–97

Do you consider the Local Plan is ...
(Please select as appropriate)

	Yes	No
Legally compliant		X
Sound		X

Please give details of why you consider the Building a Better Plan is not legally compliant o r is unsound. Please be as precise as possible.
If you wish to support the legal compliance or soundness of the Local Plan, please also use this box to set out your comments.

This box is a summary only. My full representation is the document uploaded with this form; it forms part of this representation and should be provided to the Inspector. This representation concerns nutrient neutrality, and specifically what happens when the land chosen to provide off-site mitigation discharges into a different part of Chichester Harbour from the waters that receive the development's wastewater. Allocation 2 drains to Thornham wastewater treatment works, whose outfall is in the Thorney Channel. Winter dissolved inorganic nitrogen concentrations there exceeded the Water Framework Directive good-moderate boundary in five of the seven years from 2012 to 2019, and roughly 5 sq km of intertidal habitat in that channel suffers from macroalgal growth. Natural England's Nutrient Neutrality Principles require mitigation to lie upstream of the point at which the development has its effect on the habitats site, and where the discharge is direct into the site, as Thornham's is, upstream of that discharge. Its Solent region advice makes the same river catchment as the outfall the priority location for mitigation in these harbours. The Chilgrove Farm scheme, one secured in this catchment, lies on the River Lavant and discharges into the Chichester Channel — some 11 km of tidal travel from the Thornham outfall by way of the channel confluence. It is in the same nutrient catchment as this allocation, which is why it is treated as offsetting it; my point is that the catchment is too coarse a unit, because within it the receiving waters are four separate tidal channels. The other scheme secured for this catchment, at West Itchenor, also lies on the Chichester Channel. Advising Chichester District Council in February 2025, Natural England recorded that their spatial principles require mitigation preferably to drain to the same arm of the harbour as the impact, giving Thornham and the Thorney Channel as their illustration, and that mitigation draining to another arm may be acceptable case by case or until they have further evidence suggesting a different approach. This representation offers that evidence. To test whether mitigation delivered in the Chichester Channel would reach the Thorney Channel, I built a hydrodynamic model of Chichester Harbour in Telemac-2D, forced with observed tide-gauge data and Hydrographic Office bathymetry, and simulated a continuous conservative tracer released at a representative Chichester Channel outfall. Over repeated tidal cycles the tracer moved down the Chichester Channel on the ebb, met the ebb from the Thorney and Emsworth Channels, and was carried out over the Chichester Harbour Bar into the Solent. Very little returned to the Thorney Channel. A nutrient budget which assumes that mitigation delivered in one channel offsets loading in another therefore overstates what that mitigation achieves, and the budget for the Thorney Channel would remain positive. The Plan identifies no mechanism by which this question would be asked, still less modelled, when a mitigation site is proposed.

Please set out the modification(s) you consider necessary to make the Local Plan legally compliant and sound, in respect of any legal compliance or soundness matters you have identified above.
You will need to say why each modification will make the Local Plan legally compliant or sound. It will be helpful if you are able to put forward your suggested revised wording of any policy or text. Please be as precise as possible.

That Allocation 2 be deleted from the Plan, with the consequential amendments to Policy 6, the housing trajectory and the Policies Map that follow from it. The Plan relies for this allocation on off-site nutrient mitigation in Chichester Harbour without any means of establishing that mitigation delivered in one channel of the harbour reaches the waters which actually receive the wastewater, and the hydrodynamic modelling summarised above indicates that in this harbour it does not. If the Inspector is nonetheless minded to retain the allocation, I ask in the alternative, and on this issue alone, that a criterion be added requiring that where off-site nutrient mitigation is proposed which discharges to a different arm of Chichester Harbour from the arm receiving the development's wastewater, the applicant submit hydrodynamic modelling of the harbour demonstrating that the mitigation will achieve the required nutrient reduction in the waters actually affected.

If you wish to upload any documents to support your representation, please do so below. Please note that there is a maximum file size of 50MB and you can upload a maximum of 10 files to include with your form.

- File: Plan_26_tidal_dcm_v2.pdf - Download

Examination Hearing Session Invitation

If your representation / representations are seeking a modification to the plan, do you consider it necessary to participate in examination hearing session(s)?
Please note that while this will provide an initial indication of your wish to participate in examination hearing session(s), you may be asked at a later point to confirm your request to participate.
No details on the examination hearing session(s) have yet been determined and will be made available upon the submission of the Building a Better Future Plan to the Planning Inspectorate.

Yes, I wish to participate in examination hearing session(s)

Examination Hearing Session Invitation (2)

You indicated that you wish to participate in the examination hearing session(s). Please outline why you consider this to be necessary.
Please note the Inspector will determine the most appropriate procedure to adopt to hear those who have indicated that they wish to participate in examination hearing session(s). You may be asked to confirm your wish to participate when the Inspector has identified the matters and issues for examination.

The issue turns on tidal hydrodynamics, and on a hydrodynamic model of Chichester Harbour that I have built and run for this purpose. In my work in University of Reading Department of Geography and Environmental Science I gained substantial experience with tidal models in coastal areas. The Council and the promoter will be represented at the hearing sessions, and I am able to explain the model, the assumptions behind it and its limitations, and to answer the Inspector's questions on those matters directly. A written representation cannot be tested in the same way.

Future Notification

Do you wish to be notified of any of the following milestones in the Building a Better Future Plan process?
These milestones include:

The Local Plan has been submitted for examination
The publication on the Inspector's Report
The adoption of the Local Plan

If you indicate that you wish to be notified, the email address you provided in Part A of the f orm will be used by the Council to notify you of these milestones.

Yes, I wish to be notified

Comment: ***Nutrient neutrality – ramifications of habitats site being in different catchment to mitigation site***

This is a comment on nutrient mitigation for the Allocation 2 site based upon the guidance from Natural England regarding nutrient neutrality [1].

Natural England's Nutrient Neutrality Principles [2] set out the principles that neutrality measures must meet if they are to satisfy the Habitats Regulations. Principle 3 requires the measures to be preventative rather than compensatory, spatially as well as temporally. Spatially, consideration must be given to the location of any mitigation relative to where the development will have its impact on the habitats site, and the mitigation must lie upstream of the location where the development's run-off and wastewater input will have that effect. Where the discharge is direct — that is, within the boundary of the habitats site — the measures must be upstream of that location. Where the discharge is indirect, and enters upstream in the catchment of the habitats site, the measures may be up or downstream within the catchment, provided the offsetting occurs before the point at which the development impacts the site. Thornham discharges directly into the Thorney Channel, which lies within the habitats site. The first of those two cases therefore applies, and what is required is not merely that the mitigation lie in the same catchment but that it lie upstream of the Thornham outfall. The ramifications of mitigation that does not are outlined below.

Natural England's Solent region advice [3] is to the same effect and is specific to these harbours. Section 5.34 states that for the wastewater treatment works draining to Portsmouth, Langstone and Chichester Harbours, the priority locations for mitigation are the same river catchment as the works' outfall, and section 5.35 works that through for Bosham wastewater treatment works and the arms of Chichester Harbour into which it discharges. Section 5.36 allows that there may be opportunities to mitigate within other river catchments within the harbours, to be examined case by case. This representation is such a case, examined.

The Council applies the same principle in its own terms. Its Position Statement and Mitigation Plan for Nutrient Neutral Development, August 2025 [4] requires at paragraph 3.9 that in all cases a clear scientific link be established between the proposed development and the mitigation scheme, and that any third-party scheme provide supporting evidence that the mitigation principles in Natural England's guidance have been met. Paragraph 3.10 expects the mitigation provider to demonstrate the scientific link between the mitigation site and the catchment in which the development is located. That is the test this representation applies, and the modelling described below is how it falls to be answered. The Council has commissioned such a review before: paragraph 3.27 records Ricardo's confirmation of the scientific link for the Warblington Farm scheme. What the Plan lacks is any requirement that the exercise be carried out for this allocation.

Paragraph 3.13 of the same document is also relevant to timing. For the East Hampshire catchment the Council states that there is sufficient mitigation for the short and medium term and considers long-term sufficiency likely. For the Chichester catchment — the catchment into which Emsworth drains via Thornham, and which the Habitats Regulations Assessment calls Western Streams — it states only that there are currently enough nitrogen credits to meet immediate need, and that there are likely to be enough for the short term. No claim is made beyond that, and no dwelling on this allocation is programmed before 2032/33.

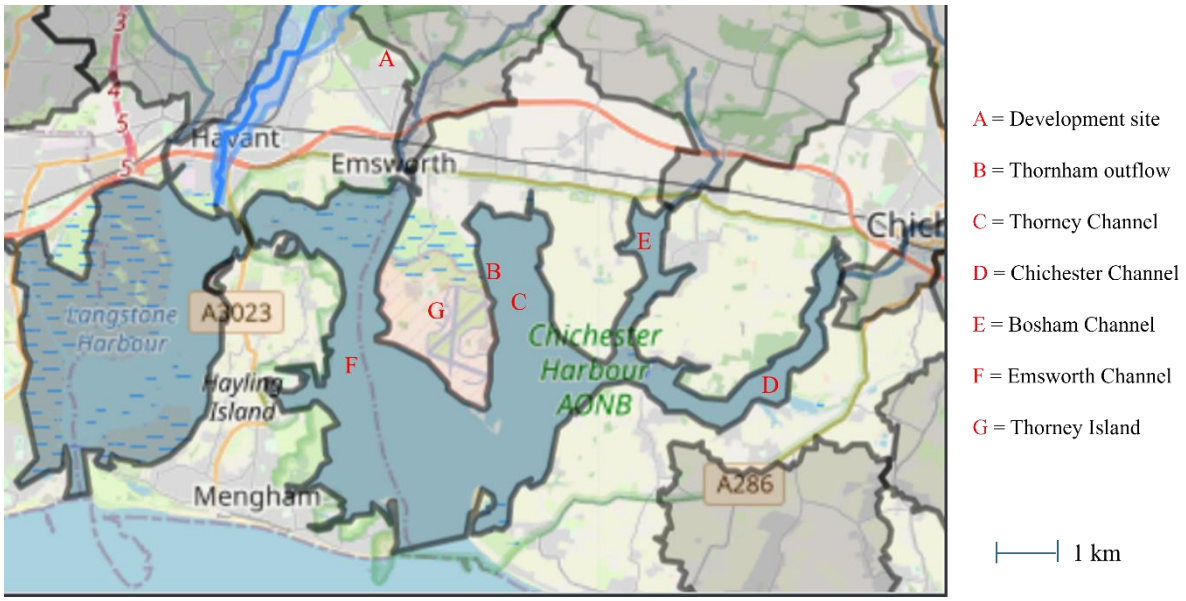

Fig.1. Chichester Harbour and main channels

Fig. 1 shows Chichester Harbour with its four main channels (Emsworth, Thorney, Bosham and Chichester). Allocation 2 (Land north of Long Copse Lane) drains to Thornham Wastewater Treatment Works (WwTW), whose outflow is in the Thorney Channel. The Thorney Channel is a habitats site which is under threat. Seawater flowing through the Channel floods a significant area (5 sq. km.) of intertidal zone. This intertidal zone suffers from problem growths of macroalgae, as with other intertidal areas in Chichester Harbour. Winter concentrations of dissolved inorganic nitrogen (DIN) in the Thorney Channel have exceeded the EA's Water Framework Directive good-moderate boundary for DIN on 5 of the 7 years in the period 2012-2019 [5]. While no data on DIN loads appear to have been published since 2019, hundreds more additional dwellings served by Thornham have been built by CDC and HBC between 2019 and 2026, and no enhanced nitrogen-removal technology has been installed there over this period, so that DIN loads in the Thorney Channel have likely increased and certainly not decreased since 2019. Natural England's assessments in 2019/20 found more than 3,000 hectares of the intertidal parts of Chichester Harbour to be in unfavourable–declining condition, with continuing net loss of saltmarsh, poor condition of the marsh that remains, and macroalgal growth among the reasons; its Condition Review of Chichester Harbour sites was published in February 2021 [6]. Thornham WwTW is scheduled for upgrade before 2030 [7]. However, even when Thornham is upgraded, a mitigation site is still likely to be required [8]

The Thorney Channel lies in the catchment of Ham Brook, a small sub-catchment of the main Western Streams Catchment. The 5 sq. km area it covers is a significant part of the Solent Maritime SAC and of the Chichester and Langstone Harbours SPA and Ramsar site. If the mitigation site is positioned such that neutrality is not achieved in the Thorney Channel, there

is no scientific certainty that the development will avoid damaging those sites. The Conservation of Habitats and Species Regulations 2017 require the competent authority to be satisfied, beyond reasonable scientific doubt, that the integrity of the European site will not be adversely affected. Mitigation must therefore be shown to offset the impact of the development in the waters where that impact occurs. If the localised nutrient pollution remains, the development is not truly neutral [9].

At this stage no planning application exists and no specific mitigation site has been identified. To serve as example, a mitigation site has been selected flowing into the River Lavant, which flows into the Chichester Channel. That is not a hypothetical choice of catchment. The Chilgrove Farm mitigation scheme, secured by Chichester District Council in August 2024 together with the South Downs National Park Authority and the landowner, covers twelve parcels across 26.01 hectares and is expected to deliver some 688 Kg/N/Yr. It lies on the River Lavant, and so discharges into the Chichester Channel. In this case, it must be necessary to check that the coastal tidal system can move the water of low nitrogen content from the mitigation site coastal outfall in the Chichester Channel to the habitats site in the Thorney Channel, so that nutrient neutrality is achieved there. In order for this water to influence the Thorney Channel, it would have to move 8 km down the Chichester Channel to its confluence with the Thorney Channel, then flow 3 km back up the Thorney Channel to reach the Thornham outfall, a total distance of 11 km.

The second scheme secured for this catchment is at West Itchenor. Chichester District Council's Planning Committee resolved on 12 February 2025 to enter into a legal agreement securing a credit-selling nitrate mitigation scheme on 23.730 hectares of arable land there, delivering a reduction of 430.12 Kg TN/yr and mitigation for around 430 dwellings [10]. West Itchenor lies on the Chichester Channel. Neither of the two schemes secured for the Western Streams catchment discharges into the Thorney Channel.

Natural England have stated the spatial principle more recently still, and applied it to this works by name. Advising Chichester District Council on the appropriate assessment of the West Itchenor scheme, they recorded that their existing spatial principles for nutrient mitigation in Chichester Harbour, set out in the Solent Nutrient Neutrality Methodology version 5 of June 2020, state that mitigation should preferably drain to the same arm of Chichester Harbour as the expected impact from development — and gave as their illustration that Thornham wastewater treatment works discharges into the Thorney Channel. Where that is not possible, they advised, mitigation draining to another arm of the harbour may be acceptable on a case-by-case assessment, or until such time as they have further evidence to suggest a different approach is required. Two things follow. Natural England still treated the June 2020 methodology as their operative spatial principles in February 2025, so it cannot be treated as spent. And they have said in terms what would cause the case-by-case approach to be revisited: further evidence.

I should record what Natural England went on to advise in that case, because it bears directly on this representation. They agreed that the West Itchenor scheme is suitable to mitigate development within the Western Streams catchment connecting to Apuldram, Thornham and Bosham wastewater treatment works. That agreement was given on the case-by-case basis their own principles provide for, on the material then before them: a hydrological report establishing that the mitigation land is connected to the Harbour, and that the lag between

cessation of agricultural use and effective mitigation is up to about one month, together with a further report of 14 October 2024 which is not among the committee papers. Nothing summarised in that report addresses the movement of water between the arms of the harbour. I do not say Natural England were wrong. I say that the question this representation raises — whether a reduction delivered into the Chichester Channel reaches the Thorney Channel — does not appear from the published record to have been modelled, and that Natural England themselves identified further evidence as the trigger for revisiting the approach.

It is important to be clear about what this does and does not show. The River Lavant lies within the same nutrient catchment as this allocation. The catchment used for these purposes is Western Streams, comprising the Ems, the Lavant and Bosham Stream; the Council's Position Statement refers to the same catchment as the Chichester catchment; and the Habitats Regulations Assessment enters Allocation 2 in Western Streams. Chilgrove and Long Copse Lane are therefore in the same catchment, and that is precisely why mitigation at the one is treated as offsetting loading from the other. My objection is not that the catchment is the wrong one. It is that the catchment is too coarse a unit for this harbour. Within a single catchment the receiving waters are four separate tidal channels, and whether a reduction delivered at the head of one reaches another is a question of tidal hydrodynamics rather than of catchment boundaries. That is the question the modelling described below answers, and it is not answered by the fact that both sites carry the same catchment label.

To investigate this, I have set up a computer-based hydrodynamic tidal model test-bed of Chichester Harbour. This uses the open-source Telemac-2D software to simulate water elevations and tidal currents at all points in the wetted area as a function of time [11]. Bathymetry data of Chichester Harbour and its approaches were obtained from the UK Hydrographic Office from hydrographic surveys carried out in 2006 [12].

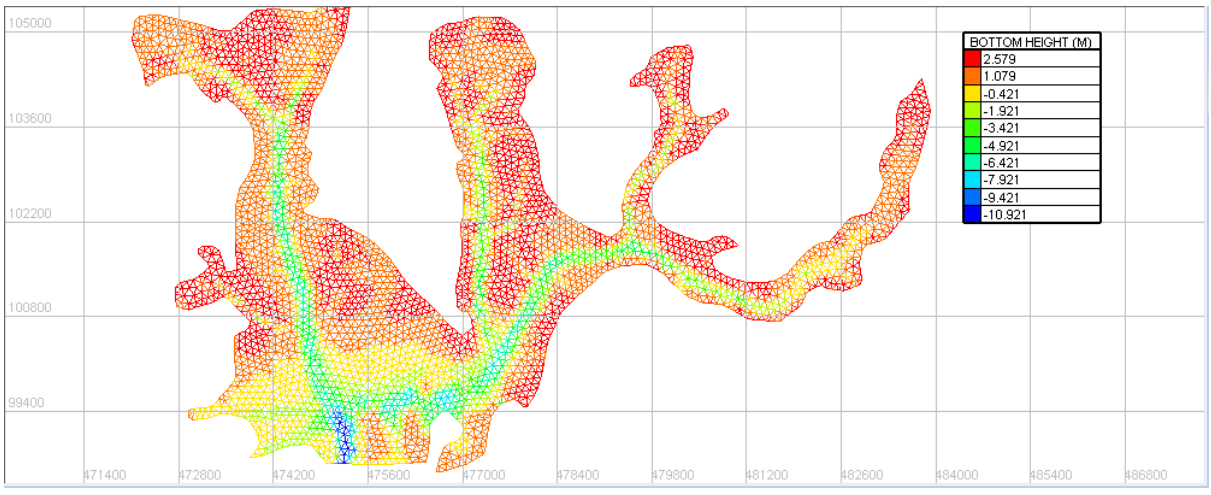

Fig. 2 Model domain and interpolated bathymetry

Fig. 2 shows the model domain and interpolated bathymetry (bottom depth relative to ODN), together with the triangular mesh used by Telemac to carry out its calculations. (Note that at present the model domain does not include Langstone Harbour, which links with the

Emsworth Channel at high tide, because the mitigation sites considered to date flow into the Chichester Channel, which is assumed little affected by Langstone Harbour). The model is set up to accommodate the wetting and drying of tidal flats over a tidal cycle, as a considerable area of tidal flats are present in the domain. The tidal model is forced using 15-minute water elevation data from the nearby Portsmouth (Camber Dock) tide gauge, which is applied at the model's open sea boundary at the south end of the blue section in fig. 2. It is assumed that surge and wave effects are a small perturbation compared to tidal forcing, so their effects are ignored.

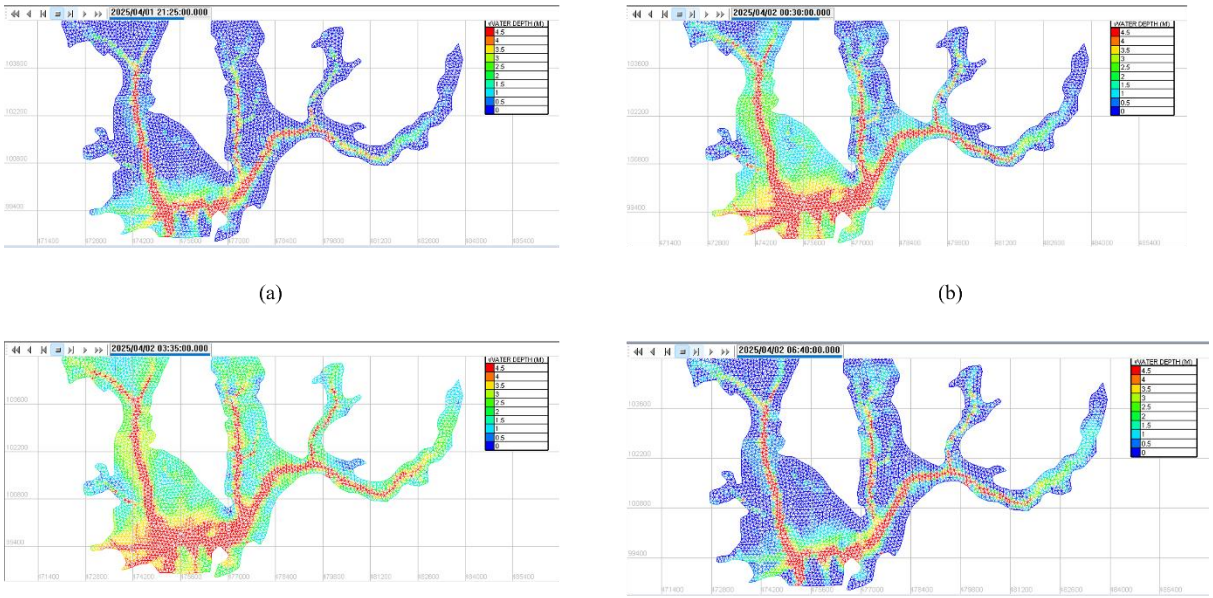

Fig. 3. Water depths over the domain at (a) 21:25 on 01/04/2025, just after low tide, (b) 00:30 on 02/04/2025, when the tide has risen substantially, (c) 03:35 on 02/04/2025, just after full tide, and (d) 06:40 on 02/04/2025, near low tide.

Fig. 3 shows examples of water depths over the domain at various stages of a tidal cycle. The model is also able to simulate continuous conservative (i.e. non-decaying) tracer inflow into the domain, and simulate how this is moved around the domain by the time-varying currents. The tracer is the water of low nitrogen content from the mitigation site. A mass-conserving advection scheme was used to prevent unrealistic tracer accumulation as water levels fluctuate.

The model was used to simulate the example above, running over many tidal cycles. It was found that the tracer certainly moved down the Chichester Channel on the ebb tide, but then it met a large body of water ebbing out of the Thorney Channel and the nearby Emsworth

Channel, which forced it out of the model domain over the Chichester Harbour Bar adjacent to East Hayling, where it was mixed with the general Solent waters. The water flowing back into the Thorney Channel on the rising tide then did not have a much lower nitrogen content than before the mitigation took place. Note that the mitigation calculation assumes that all the water of low nitrogen content input to the Chichester Channel will find its way into the Thorney Channel, whereas the simulation shows that very little of it does. Meanwhile the nutrient outflow from Thornham WwTW would have increased if the Long Copse Lane estate had been built. The nutrient budget for the Thorney Channel would therefore be positive, which is what the law arising from the Dutch Case is designed to prevent [9]. While these model results have not been validated by observations, these are most likely to bring out fine-scale differences in the tracer pathways, and I am confident that the broad-scale result above holds.

When an actual mitigation site is chosen in a planning application, this should be assessed by undertaking a similar modelling study to check whether or not mitigation could be achieved in the Thorney Channel. Where possible the modelling should be validated by monitoring.

If, as I believe, the nutrient budget predicted in the Thorney Channel due to the proposed mitigation was positive, this would show the sense behind NE's rule that the mitigation site and habitats site should both lie in the same catchment.

HBC's proposed Plan fails to identify the need for a mechanism whereby such modelling could be performed if deemed necessary. Possibly it could be performed as part of NE's Environmental Delivery Plan, or perhaps HBC could employ an external consultant. HBC will continue to be the Competent Authority and NE the Statutory Adviser when EDPs are employed. I submit that failure to identify the need for such a mechanism is a shortfall in the Plan.

One further point is addressed to plan-making rather than to applications. In the advice by which Natural England put this regime in place [13], competent authorities are recommended to consider carefully whether it is possible to allocate development in catchments, or parts of catchments, where applying nutrient neutrality is likely to face significant constraints. That is advice about where to allocate, and it is the question now before the Inspector.

Relevant experience. In my work in University of Reading Department of Geography and Environmental Science I gained substantial experience with tidal models in coastal areas; see for example ref. [14].

References

1. Nutrient Neutrality Generic Methodology. Natural England. February 2022.
2. Nutrient Neutrality Principles. Natural England Technical Information Note TIN186, first published August 2022 (Edition 2, July 2023).
3. Advice on Achieving Nutrient Neutrality for New Development in the Solent Region. Natural England, Version 4, March 2020 (sections 5.34–5.36).
4. Position Statement and Mitigation Plan for Nutrient Neutral Development. Havant Borough Council, August 2025.

5. Review of the Warblington Farm Mitigation Option for Nutrient Neutral Development in the Havant Borough. Report for Havant Borough Council. Ricardo Energy and Environment. June 2020.
6. Condition Review of Chichester Harbour sites. Natural England, February 2021.
7. Southern Water. Drainage and Management Plan. Thornham Wastewater System Plan. 2023. https://www.southernwater.co.uk/media/h3rlztb4/l3_thor.pdf
8. Nutrient neutrality FAQs – Local Government Association. https://www.local.gov.uk/pas/topics/environment/nutrient-neutrality-and-planning-system/faqs#:~:text=The%20amendment%20reduces%20the%20level,practice%20through%20the%20nutrient%20network.8
9. House of Commons Library. Nutrient neutrality and housing development. October 2023.
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11. opentelemac.org. https://www.opentelemac.org
12. Gov.uk: Admiralty Marine Data Portal. https://www.gov.uk/guidance/inspire-portal-and-medin-bathymetry-data-archive-centre
13. Natural England Water Quality and Nutrient Neutrality Advice (16 March 2022) (NE785).
14. Thornhill GD, Mason DC, Dance SL, Lawless AS and Nichols NK (2012). Integration of 3D Variational Data Assimilation with a coastal area morphodynamic model. *Coastal Engineering,* 69, 82-96.DOI: 10.1016/j.coastaleng.2012.05.010.