BROOKBANKS

HBF
HOME BUILDERS FEDERATION

The extent to which housebuilding contributes to nutrient pollution across watercourses in England

Home Builders Federation (HBF)

November 2023

Executive Summary

- Brookbanks is appointed by the Home Builders Federation ("HBF") to undertake research to establish the volume of nutrients produced from the occupation of new homes annually and for this to be expressed as a percentage of the nutrients emitted overall entering watercourses in England. **For the purposes of this report, only nutrients from housebuilding in England is considered.**

- From June 2019 Natural England (NE, 2019) issued advice to the Chief Executives and Heads of Planning of local planning authorities advising them not to approve plans and projects for new overnight accommodation, including new homes, where this could increase nutrient emissions. The concern is that the creation of new overnight accommodation will increase the emission of nutrients affecting water quality and thereby the condition of protected habitats. To date, the advice applies to 74 local planning authorities across 27 water catchments (NE, 2022[*1]).

- NE has highlighted that "*in freshwater habitats and estuaries, poor water quality due to nutrient enrichment from elevated nitrogen and phosphorus levels is one of the primary reasons for habitats sites being in unfavourable condition"*. To combat this, NE has identified that significant reductions in nutrients are needed and advises that nutrient neutrality presents an acceptable means of counterbalancing nutrient impacts of development.

- It is generally acknowledged that the principal source of nutrients over and above natural background occurrences is from wastewater discharged from the existing population and agriculture (Environment Agency [EA], 2019[*1*2]). This forms the foundation of analysis within this report.

- The Office for National Statistics ([ONS], 2022[*1]) indicates that an average of 230,000 new dwellings have been built each year for the previous three years in England from 2020 to 2022. This suggests a theoretical population increase of 552,000 persons per year, based on the ONS national average of 2.4 persons per dwelling (ONS, 2021[*1]). As a proportion of the overall population in England, this represents a circa 0.98% increase in nutrients from additional wastewater discharged into the watercourses. Research from the Environment Agency (EA) states that sewage treatment is responsible for 30% of Total Nitrogen (TN) (EA, 2019[*1]) and 75% Total Phosphorus (TP) (EA, 2019[*2]) found in the watercourse. The estimated proportion of TN and TP found in watercourses as a consequence of an average of 230,000 dwellings built each year can therefore be calculated as shown in the table below.

Proportion of nutrients emitted from new housebuilding to watercourses in England.

	Proportion of population from housing delivery	Proportion of nutrients from wastewater (EA, 2019[*1*2])	Overall proportion of nutrients from new housing
Total Nitrogen	0.98%	30%	0.29%
Total Phosphorus	0.98%	75%	0.73%

- These proportions can be considered generous as they are based on an assumption that each new home will be occupied by 2.4 people. This is thought to represent a significant overestimation of the new population associated with housebuilding given the earlier research by Lichfields for HBF (2022); *Achieving nutrient neutrality for new housing development. Demographic analysis of Natural England's advice*.

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Table of Acronyms

DEFRA	Department for Environment, Food and Rural Affairs	**SAC**	Special Area of Conservation
DLUHC	Department for Levelling Up, Housing and Communities	**SPA**	Special Protection Area
EA	Environment Agency	**SuDS**	Sustainable Drainage Systems
ECJ	The European Court of Justice	**HBF**	Home Builders Federation
LPA	Local Planning Authority	**TN**	Total Nitrogen
NE	Natural England	**TP**	Total Phosphorous
NVZ	Nitrate Vulnerable Zone	**WwTW**	Wastewater Treatment Works
ONS	Office for National Statistics		

1 Introduction

1.1 HBF has sought to establish the extent to which the occupancy of new homes contributes to the release of nutrients into water bodies each year. Under current Natural England (NE) guidance, new housebuilding has been delayed in many catchments owing to concerns about the effect of nutrient emissions on protected habitats. Housebuilding cannot proceed unless a mitigation solution can be established and is operational.

1.2 The Habitats Regulations (Conservation of Habitats and Species (England and Wales) Regulations 2017 establishes protections for sites in England. The legislation requires public bodies to assess the environmental impact of plans and projects on these sites. In November 2018, the European Court of Justice (ECJ) ruled that any additional nutrient loading to designated sites (i.e. net increase in concentrations of nutrients per litre of water), including Special Areas of Conservation (SACs), Ramsar and Special Protection Areas (SPAs) that were already found to be in unfavourable condition would be unlawful. This is because increase in Total Nitrogen (TN) and Total Phosphorus (TP) has the potential to catalyse eutrophication within designated sites.

1.3 Since June 2019 NE (NE, 2022[*1]) has issued advice to the Local Planning Authority (LPA) Chief Executive and Heads of Planning where development proposals have the potential to affect water quality as a consequence of an increase in nutrient emissions. The advice currently applies to 74 LPAs across 27 catchments.

1.4 NE has highlighted that "in freshwater habitats and estuaries, poor water quality due to nutrient enrichment from elevated nitrogen and phosphorus levels is one of the primary reasons for habitats sites being in unfavourable condition". To combat this, NE state that significant reductions in nutrients are needed and therefore advises that nutrient neutrality presents an acceptable means of counterbalancing nutrient impacts of development.

1.5 It is understood that NE are continuing to research the extent to which new housing will impact these designated sites. However, due to lack of additional data, there is a large degree of uncertainty which means that the risk of eutrophication from additional nutrients discharged from development cannot be ruled out.

1.6 According to this guidance, no housing development can be approved and the homes occupied unless a nutrient neutrality assessment has been completed and a mitigation strategy has been devised, approved and implemented. This is delaying many thousands of homes, potentially as many as 150,000 according to HBF, while housebuilders attempt to identify solutions. Mitigation strategies are typically costly and time consuming to co-ordinate and achieve, leaving the housebuilding industry in a challenging position.

1.7 According to the Environment Agency (2019[*1*2]) nutrients associated with wastewater from the existing population and agricultural practice are the main sources for nutrients entering into water courses. The relationship between population growth and housebuilding has been analysed in order to pinpoint the source of excess nutrient discharge. In terms of housebuilding, nutrients are a product of an increase in population rather than the number of dwellings built. Consequently, decision makers need to have regard to the net increase locally in population rather than the net increase in homes. This issue is explored later in the report.

1.8 This report examines the extent to which the occupation of new homes contributes to an increase in nutrient emissions each year compared to, and expressed as, a percentage of emissions overall.

2 Data Overview

2.1 This section reviews the recent data in the public domain drawing upon a range of published sources. To answer the research question the findings in this section are used to assess the proportion of nutrients discharged into the system as a consequence of new housebuilding.

Dwellings Review

2.2 According to the Office of National Statistics (ONS), there were 24.8 million households in England and Wales in 2021 (ONS, 2022[*1]).

2.3 In addition to this, the UK Parliament *"Tackling the under-supply of housing in England"* report highlights that there were 233,000 homes delivered in 2021 to 2022 (rounded) in England (UK Parliament, 2023). Supporting research found that new housing supply had been increasing annually from a low point of circa. 125,000 in 2012/13, achieving a high point of circa. 243,000 new homes in 2019/20 (Department for Levelling Up, Housing and Communities [DLUHC], 2022[*1]). Over the last three years, an average of 230,000 new homes have been delivered (DLUHC, 2022[*1]). Therefore, for the purposes of this report, this average figure is applied to the subsequent calculations.

Population Growth

2.4 According to the ONS latest estimates for 2023 (ONS, 2022[*2]), England has a population of 56,536,400 persons. For context, the population of the UK is broken down as shown in **Table 2-1** below.

Table 2-1: UK Population statistics (ONS, 2022[*2])

Country	2023 Population Estimate
England	56,536,400
Scotland	5,479,900
Wales	3,105,400
Northern Ireland	1,904,600

2.5 For the purposes of this report, the population of England and associated population growth statistics are applied to determine the overarching research questions.

Moving Statistics

2.6 The English Housing Survey 2021-2022 household moves – fact sheet, published on 13th July 2023 (DLUHC, 2023[*1]) sets out a number of moving statistics for England. It found that in 2021-2022, 70% of social renters who had moved in the last three years had only relocated within five miles of their previous home, compared with 45% of private renters and 51% of owner occupiers, shown in **Figure 2-1** below.

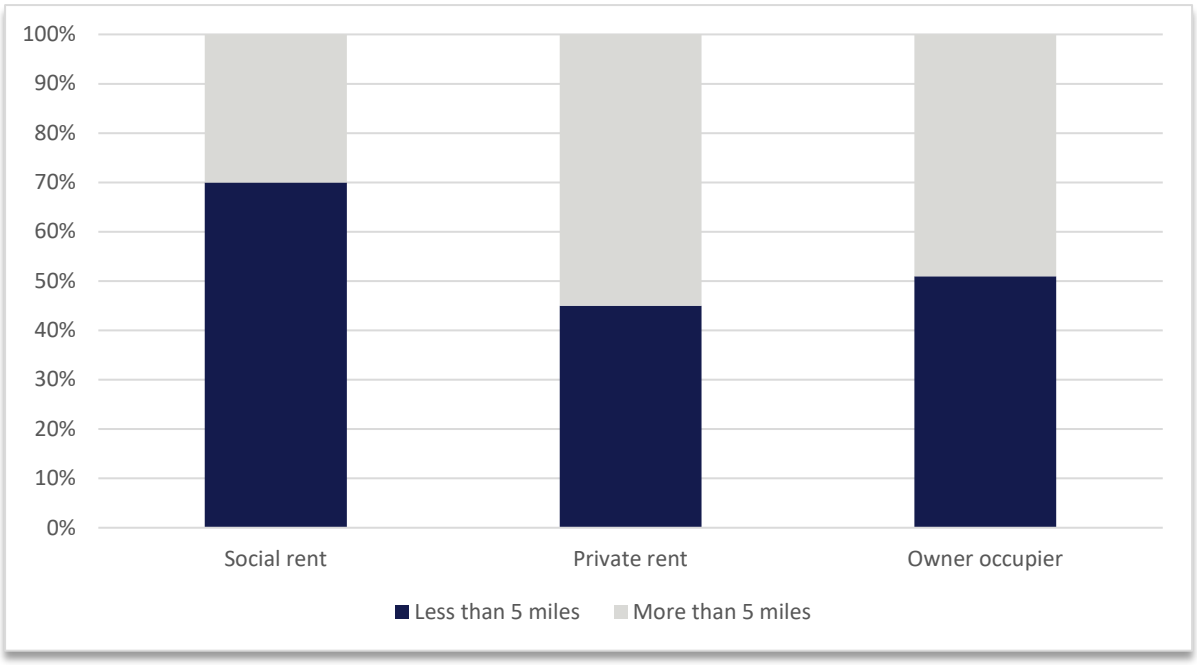

Figure 2-1: Moving statistics by tenure

2.7 The research also found that people aged 55 and over are more likely to move beyond five miles from their existing home (44% moved within five miles) rather than those between aged between 16-54 (53% moved within five miles). Further to this, only 7% of people aged 16-54 moved further than fifty miles, along with 21% of those aged 55+. This is summarised in **Figure 2-2** below.

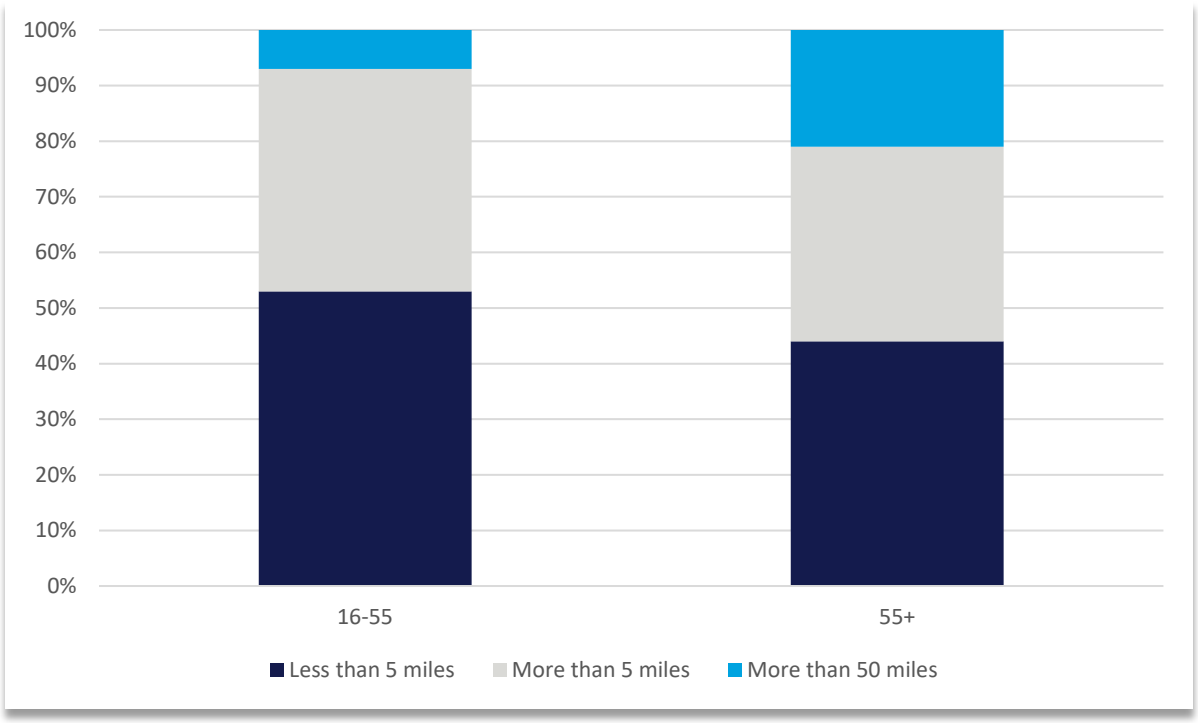

Figure 2-2: Moving statistics by age

Nutrient contributors

2.8 According to government's Land Use Statistics (DLUHC, 2022[*2]), developed land accounts for 8.70% of the entire land area of England, with 91.10% categorised as undeveloped land and a further 0.20% as "vacant". Further to this, the research found that the top three land uses in England are agriculture (63.10%), forestry, open land and water (20.10%) and residential gardens (4.90%).

2.9 The Environment Agency's (EA) River Basin Management Plan 2021 highlights that agriculture is responsible for circa 70% of TN entering the watercourses, with sewage effluent accounting for less than 30% (EA, 2019[*1]).

2.10 Conversely, the EA's *Phosphorus and Freshwater Eutrophication Pressure Narrative*, published October 2019 (EA, 2019[*2]), identifies the largest source of TP in the river system to be sewage effluent, accounting for approximately 60 – 80%, with agriculture accounting for circa 25% of TP discharged to the water system in England.

Nutrient emissions

2.11 Nutrient emissions from new housing development is caused by surface water runoff and foul water entering the system from an increase in population. Therefore, it is necessary to review both elements to ensure that all nutrient emissions from housebuilding are accounted for.

Residential Surface water runoff

2.12 NE have commissioned a wide range of soil testing to determine leachate rates for different land types with varying characteristics, including catchment, drainage capacity, rainfall, proximity to a Nitrate Vulnerable Zone (NVZ). This allowed for the development of nutrient budget calculators and generic methodology guidance, released by NE in March 2022 (NE, 2022[*2]). Within these calculators, leachate rates are assigned to each bespoke arrangement of land type and characteristics.

2.13 From review of the leachate rates provided by NE in these calculators, it is noted that change in land use from agriculture to residential generally adds very little in the way of nutrients. In the case of TN, it is often found that there is betterment in TN emissions from removing land from agriculture to deliver housing developments.

2.14 In the case of TP, it is found that change in land use typically results in a non-material net increase in TP to the system. However, with the introduction of CIRIA's guidance relating to the capacity for Sustainable Drainage Systems (SuDS) to treat TP, it is noted that TP runoff can be significantly reduced from developments (CIRIA, 2023[*1]), particularly with upcoming requirements for SuDS management trains to be embedded into development. SuDS management "trains", or "treatment trains", promote use of a logical series of drainage techniques to alter the flow and quality characteristics of the run off through stages before reaching the receiving watercourse or water body. In some cases, it can be proven that use of onsite SuDS can reduce amount of TP run off by 100%. Similar guidance has recently been released with reference to Total Nitrogen (CIRIA, 2023[*2]).

2.15 Under the current planning system, the use of SuDS within new developments is required for major developments of over ten dwellings. In addition, this presumption of SuDS to a high standard is reaffirmed with plans to enact Schedule 3 of the Flood and Water Management Act. This seeks to enshrine in law, as well as the planning system, the process for new development to include and maintain SuDS. It is likely that Schedule 3 will be enacted in 2024.

2.16 It can be assumed, therefore, that leachate rates from new residential development will be addressed as a

consequence of the mandatory requirements to provide SuDS.

2.17 Examples of the export rates of nutrients associated with changes in land use are illustrated in **Table 2-2** below**.**

Table 2-2: Nutrient Runoff from Surface Water Comparator Table

	Existing Land Type		Residential Land Use Leachate Rate	
Land Type	kgN/ha/year	kgP/ha/year	kgN/ha/year	kgP/ha/year
Teesmouth and Cleveland Coast SPA (NE, Ricardo, 2022[*1]) (Skerne catchment, impeded drainage soils, 700.1-750mm/year, NVZ - yes)				
Cereal	22.85		13.51	
Mixed	22.06		13.51	
General	14.40		13.51	
Somerset Levels and Moors Ramsar (NE, Ricardo, 2022[*2]) (Parrett catchment, impeded drainage soils, 700.1-750mm/year, NVZ - yes)				
Cereal		0.90		1.45*
Mixed		0.90		1.45*
General		0.65		1.45*

*Urban runoff has potential to be reduced by up to 100% in line with Sustainable Drainage Systems (SuDS) guidance from the Construction Industry Research and Information Association (CIRIA, 2023[*1]).

2.18 For the purpose of this report, we have assumed that the net increase in nutrients from surface water is non-material. It is insignificant in terms of the volume of nutrients entering the system.

Residential Foul water emissions

2.19 It is acknowledged that foul water from the occupation of new homes is the biggest contributor to nutrients in watercourses from new housebuilding.

2.20 For this report, it is important to provide context around the quantity of nutrients produced by people each year. Research set out in NE's *Advice on nutrient neutrality for new development in the Stour Catchment in Relation to Stodmarsh Designated Sites – For Local Planning Authorities* (NE, 2020) identifies the average kilograms of TN and TP produced from foul water prior to treatment per person per year. These figures are based on wider research and estimated to be 3.50kgN/person/year (Poole Harbour LPA's, 2017) and 0.99kgP/person/year (NE, 2015) respectively. This assists in providing context for this subsequent review.

2.21 It is also noted that where a Wastewater Treatment Works (WwTW) has no set permit level for TN or TP, NE assumes an effluent concentration of 27.00mgN/l and 8.00mgP/l respectively (NE, 2022[*2]). This results in circa. 1.38kgN/person/year and 0.41kgP/person/year, representing 39% and 41% treatment respectively.

Agricultural Emissions

2.22 The nitrate leaching tool: user guide, Chief Scientist's Group report, produced by the EA in 2021 (EA, 2021) provides an overview of Total Nitrogen production from grazing livestock. This is informed by the Department for the Environment, Food and Rural Affairs (DEFRA, 2013) *NVZ Guidance - PB 14050,* with *'standard values' tables.*

2.23 Examples of nitrogen production figures are set out below in Table 2-3, as shown in the EA report (2021).

Table 2-3: Nitrogen production by grazing livestock (as shown in EA, 2021)

Livestock Type	Total Nitrogen produced (kg/year)
Dairy Herd	
1 dairy cow after first calf (over 9,000 litres milk yield)	115.00
1 dairy cow after first calf (6,000 - 9,000 litres milk yield)	101.00
1 dairy after first calf (up to 6,000 litres milk yield)	77.00
Beef Herd	
1 beef cow from 2 months and less than 12	28.00
1 beef cow from 12 months and less than 24 months	50.00
1 beef cow for slaughter 24 months and over	50.00
1 beef cow for breeding 24 months and over weighing up to 500kg	61.00
1 beef cow for breeding 24 months and over weighing over 500kg	83.00
Sheep herd	
1 sheep less than 60kg after lambing	7.60
1 sheep over 60kg after lambing	11.90

2.24 These figures are explored further in the following section.

3 Methodology and Results

3.1 This section utilises the figures identified in section two to answer the research question to determine the proportion of additional nutrients entering the watercourses as a consequence of housebuilding in England.

3.2 In order to determine this as a percentage of nutrient emissions overall we have considered population statistics and the theoretical increase in population associated with the number of homes built on average in recent years. As we have demonstrated in the review of data above, the nutrients in foul water represent by far the greatest source of the nutrients associated with new housebuilding. Effluent in foul water (faecal matter and urine) is generated by the population that occupies an area, like a water catchment, and is irrelevant to the number of dwellings in that catchment. Therefore, it is important to consider this during the subsequent review and analysis, as with any further investigation into this topic.

3.3 This section reviews initially the percentage increase in population that might in theory be associated with housebuilding. This is based on the national average number of people that occupy each home in England which is 2.4 persons (ONS, 2021[*1]). This is also the occupancy rate that Natural England advises is used to calculate the volume of nutrients produced by each dwelling. The proportion of nutrients associated with this is then calculated in order to understand the magnitude of the impact associated with new housebuilding each year.

Increase in nutrients through additional population

3.4 In the last three years an average of 230,000 new dwellings have been completed annually. Assuming an occupancy rate of 2.4 persons per dwelling, this would suggest, in theory, an additional population of 552,000 persons per year depositing nutrients in the system. This assumes that these are all new, additional people occupying these newly constructed homes, whereas in reality, many of these people will already be living in the areas in contention. The impact of this is discussed further in Section 4 of this report.

3.5 The population of England according to the latest estimates is 56,536,400 persons. Therefore, as a proportion of the overall population in England, the theoretical growth in the population associated with new housing built each year in the last three years would account for a 0.98% increase in nutrients.

3.6 The implications and limitations of utilising theoretical population growth to quantify nutrient increase is explored further in section 4 of this note.

TN and TP discharged into watercourses

3.7 Research carried out by the EA sets out the proportion of Total Nitrogen (TN) and Total Phosphorus (TP) entering the system from sewage treatment, summarised in **Table 3-1** below.

Table 3-1: Proportional nutrients contribution to the water system (EA, 2019*[1*2])

Assumptions	Sewage Treatment	Agriculture
Total Nitrogen	**30%**	70%
Total Phosphorus	**75%**	25%

3.8 Compared to farming, sewage treatment is responsible for a relatively minor proportion of the overall TN discharged to the watercourses. Based on a 0.98% increase in population, one can determine that the additional population associated with housebuilding account for 30% of this figure of 0.98%, resulting in a 0.29% contribution to the overall issues associated with eutrophication from surplus nutrients. **Figure 3-1** below illustrates the minor extent to which TN from new dwellings will contribute to the problem of eutrophication and the deterioration of water-based habitats.

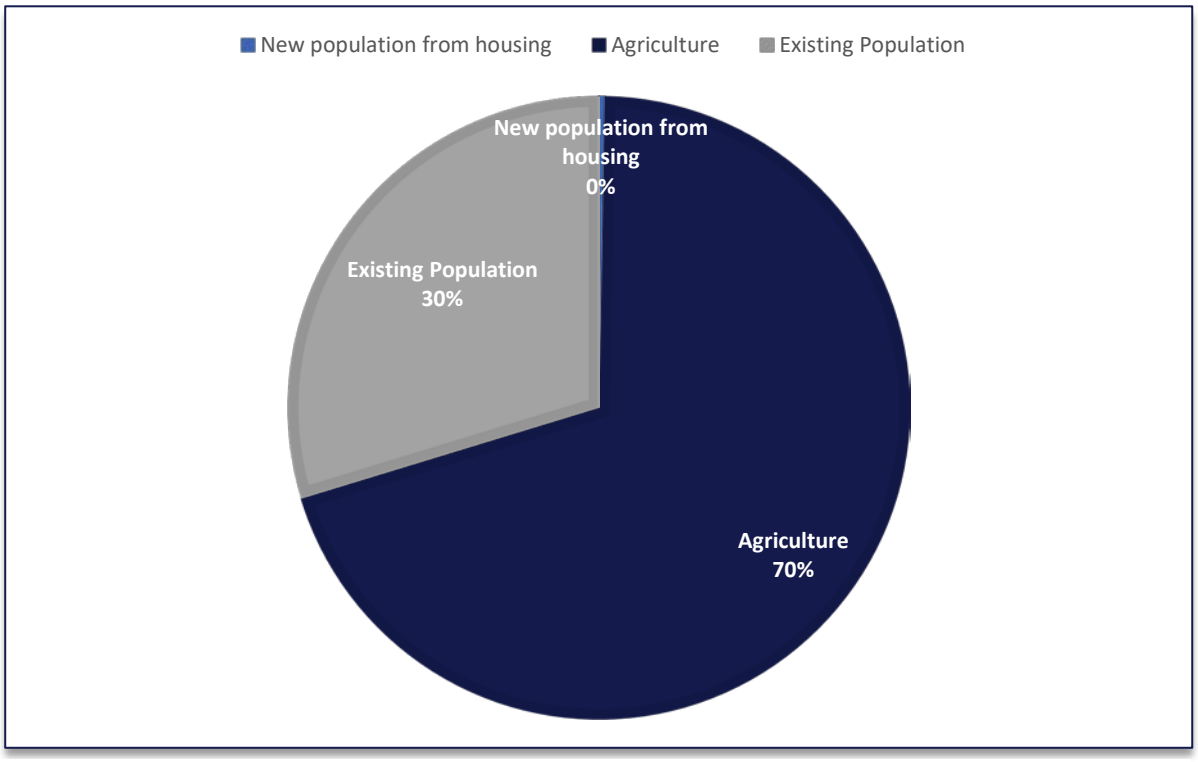

Figure 3-1: Contribution of new housing to Total Nitrogen into the water system

3.9 Similarly, with regard to TP, although the proportion from different sources varies between and within river basins and catchments, circa 75% of TP in the water system occurs from sewage effluent. It is therefore considered that 0.73% (75% of the 0.98% increase in nutrients to rivers) of the increase in TP to the water system, causing eutrophication, can be attributed to the additional population associated with housebuilding each year. This is shown as a proportion of overall TP entering the watercourses in England in **Figure 3-2** below.

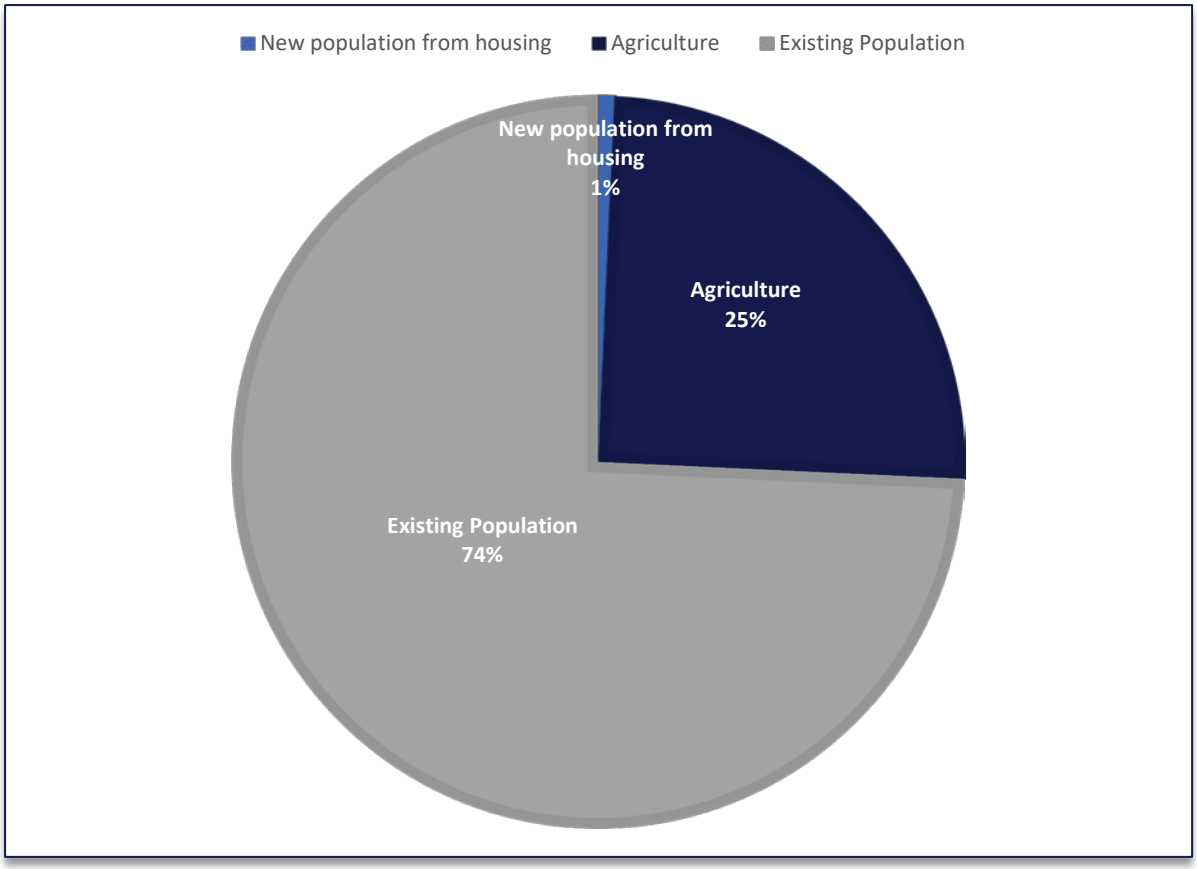

Figure 3-2: Contribution of new housing to Total Phosphorus into the water system

3.10 Therefore, one may conclude that the theoretical population associated with new housebuilding will make a very small contribution overall to the volume of nutrients entering the water system. We will explore this further in section 4.

Impact of the dwellings caught by Nutrient Neutrality

3.11 DLUHC's (2023[*2]) estimate of homes subject to nutrient neutrality found that an estimated 7.9% of new addresses created between 2015/2016 and 2017/2018 fall within nutrient advice catchments. This is equivalent to circa 16,500 dwellings per year. It is estimated, therefore, that in the remaining years up to 2030, 16,500 dwellings per year might not be built or occupied as a consequence of NE's nutrient neutrality advice remaining in force.

3.12 Applying the same methodology as above, it is possible to calculate the proportion of nutrients that these 16,500 dwellings may potentially emit as a percentage of nutrients overall entering the watercourse.

3.13 Assuming an occupancy rate of 2.4 persons per dwelling, there would, in theory, be an additional 39,600 persons adding waste to the foul water network. As a proportion of the overall population of England, this represents a 0.07% population increase. As shown in **Table 3-1** above, sewage treatment contributes approximately 30% of TN in the water system. Therefore, in theory these 16,500 delayed dwellings would account for 0.02% of the TN overall entering the watercourses.

3.14 Similarly, sewage treatment contributes circa. 75% to the overall TP entering the system and therefore the 16,500 dwellings would contribute circa. 0.05% of the total TP discharged into the watercourses.

Agriculture vs. new housebuilding

3.15 In section 2 we set out the EA research into TN produced by livestock grazing (EA, 2021) along with the volume of nutrients produced by the population from sewerage effluent. From this data it is possible to consider the quantity of new housing that would be deliverable relative to the nutrients produced by livestock.

3.16 **Table 3-2** sets out the average TN produced by livestock per year. This is followed by **Table 3-3**, which sets out the TN produced by one household per year, based on an assumed TN permit limit of 27mg/l suggested by NE for WwTWs without a permit in place.

Table 3-2: TN produced by livestock

Livestock Type	Total Nitrogen produced	
1no. Dairy Cow (after first calf)	97.69	kg/year
1no. Beef Cow	54.40	kg/year
1no. Sheep	9.75	kg/year

Table 3-3: TN produced by household sewage effluent

WwTW limit	27	mg/l
Average water consumption	140	Litres/person/day
Total Nitrogen discharged to watercourse from WwTW	3,780	mg/person/day
	1,379,700.00	mg/person/year
	1.38	kg/person/year
Total Nitrogen discharged to watercourse from WwTW per household	3.31	kg/household/year

3.17 From the above tables, it can be seen that on average, a household will discharge circa. 3.31kgN/year into the watercourses once treated and discharged from the WwTW. From this, it is possible to calculate the number of households equivalent to that of livestock, summarised in **Table 3-4** below.

Table 3-4: Number of dwellings equivalent

TN Produced from Livestock (kgN/year)		Household Sewage TN (kgN/year)	Number of new dwellings equivalent (no.)	Explanation
1 no. dairy cow	97.69	3.31	29	Livestock / Sewage
1 no. beef cow	54.40	3.31	16	Livestock / Sewage
1 no. sheep	9.75	3.31	3	Livestock / Sewage

4 Discussion

4.1 In the previous section we demonstrated that new housebuilding was responsible for a negligible proportion of nutrients entering watercourses. Even those figures may be too high when one considers the likely net change in population.

4.2 Lichfields (2023) *Nutrient Neutrality Solution Finding: Identifying Mitigation Requirements to 2030*, prepared on behalf of the HBF, explains that the key issue when analysing the cause of eutrophication to watercourses is the size of the existing population. This forms the foundation of the calculations carried out in the previous section on the basis of the assumption that new housing will bring with it a net increase in population. However, Lichfields' research found that where new homes are constructed, it is unrealistic to assume that all those dwellings will be occupied by new people moving into an area. The research found that the application of the national average household size figure of 2.4 (as advocated by NE's guidance) results in significant overestimation of the likely increase in population associated with new housebuilding in the catchments subject to Natural England's advice.

4.3 As the document highlights:

"there is not a perfect correlation between the delivery of new housing and the increase of population. This is because it is changes in household formation and occupancy levels which result in a need for an increased number of dwellings to house the existing population."

4.4 This can be shown in **Figure 4-1** below. It can be seen that there is no direct link between new housing and population growth. In fact, in some cases, it shows that housing delivery is generally attempting to maintain pace with population growth.

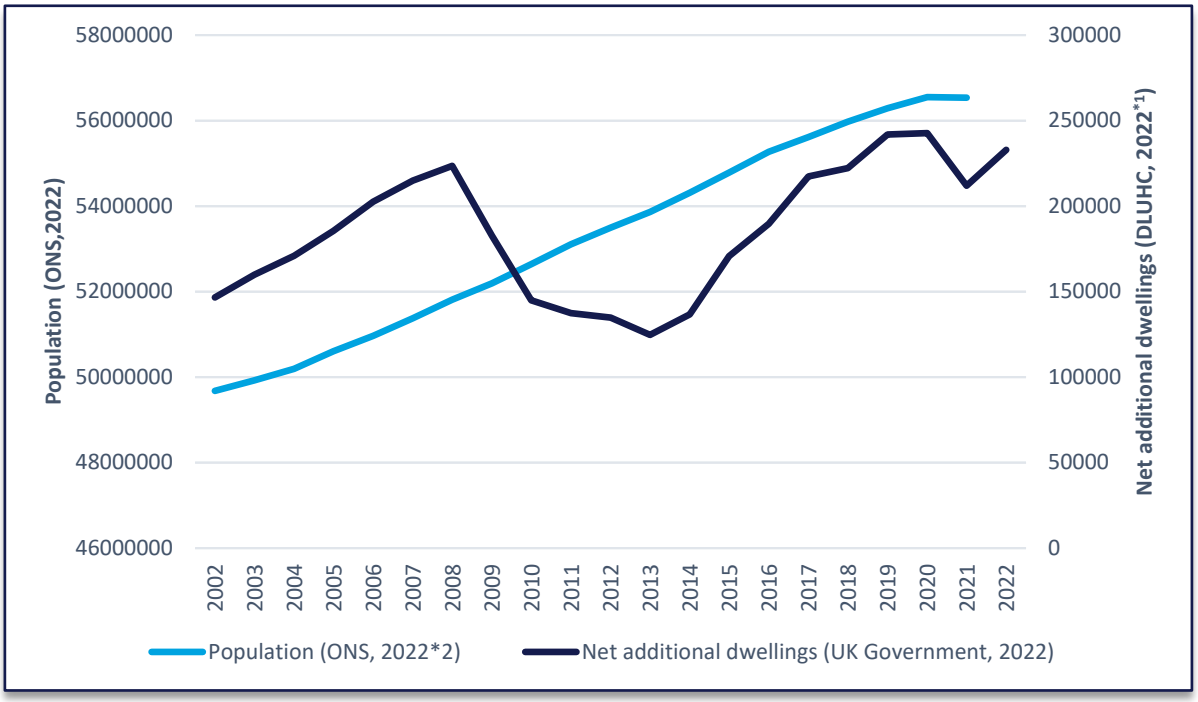

Figure 4-1: Housing delivery and population growth

4.5 It can be seen that between 2007 and 2013 there was a significant drop in housebuilding, even though population growth remained relatively constant.

4.6 Regardless of the level of housing delivery, population growth has remained relatively consistent. Given the consistent growth in population it is evident that resisting housebuilding will have little beneficial effect in addressing the problems associated with nutrient emissions in our rivers.

Net additional average household size

4.7 Lichfields (2023) explains that net additional average household size that can be expected to reside within any development can be calculated by dividing the net population change by the net change in households. Their results for the Teesmouth and Cleveland Coast, Stodmarsh and Solent catchments are summarised in **Table 4-1** below.

Table 4-1: Net additional household size across each catchment, taken from Lichfields (2023)

Catchment	Net additional average household size
Teesmouth and Cleveland Coast	1.52
Stodmarsh	1.75
Solent	1.67
Average	**1.65**

4.8 The three catchments highlighted are indicative of the situation overall across most of the other catchments. Geographically, the above captures population growth and new housing from the north, south and south east of England. The catchments also include a mixture or rural and urban land.

4.9 Therefore, if one assumes that the net average household size of 1.65 persons per dwelling is more typical of occupancy levels in homes in the catchments affected it is possible to re-assess the proportion of nutrients that might be generated based on this metric.

4.10 Assuming a net additional population of 1.65 persons across 230,000 new houses equals a population increase of 379,500, an approximate population increase of 0.67%. Based on this, **Table 4-2** below calculates the approximate proportion of TN and TP contributed to the watercourses.

Table 4-2: Proportion of nutrients accounted for from wastewater from net additional population wastewater

	Proportion of population from housing delivery	Proportion of nutrients from wastewater (EA, 2019[*1][*2])	Overall proportion of nutrients from new housing
Total Nitrogen	0.67%	30%	**0.2%**
Total Phosphorus	0.67%	75%	**0.5%**

4.11 From this we can see that when one considers the net increase in population the volume of nutrients generated by the public is likely to be even less then the estimate we have provided in Section 3 of this report.

Population migration

4.12 Lichfields (2023) highlights that it is only those net additional people moving into a catchment from elsewhere for whom a developer would have to make provision in terms of mitigation. In section 2 "Data Overview", it was noted that The Housing Survey's (DLUHC, 2023[*1]) review of household moves found that circa 50% of all people relocated less than five miles from their existing dwelling in the year 2021-2022. These findings are summarised in **Table 4-3** below.

Table 4-3: Relocation statistics summary for 2021-2022 (DLUHC, 2023[*1])

	Age Range	
	16 - 54	**Aged 55 +**
Below 5 miles	**53%**	**44%**
Over 5 miles	40%	35%
Over 50 miles	7%	21%

4.13 It can be seen that approximately half of moving households relocate within five miles of their current home. It is therefore suggested that the proportion of nutrients emitted could be halved again as approximately half of these movers will be locating to somewhere close to their previous home. Consequently, many of these people will continue to live in the same catchment placing no additional demands on foul water treatment. Moreover, it is likely that the population will continue to grow irrespective of house building.

4.14 It is evident from this that maintaining the moratorium on housebuilding will make no material difference in reversing the problem of eutrophication and poor river quality.

5 Conclusions

5.1 This report has reviewed the data available to establish the proportion of nutrients produced by the occupation of new homes. It has expressed this as a percentage of the problem overall.

5.2 Advice from NE has resulted in an effective moratorium on new housebuilding across a large area of England owing to growing concerns about the deteriorating condition of rivers and the effect this is having on designated habitats. This report highlights how the chief source of nutrient-related pollution is from agricultural activity as well as wastewater from the existing built environment and its human population.

5.3 The activity of housebuilding is not the driver of nutrient-related pollution. It is the growth in population in the catchments affected. This paper finds that the delivery of an average of 230,000 homes a year would contribute only an additional 0.29% TN and 0.73% TP to the water system.

5.4 This proportion is a liberal estimate because it is based on a national average occupancy rate of 2.4 persons per dwelling. The application of this assumption will overestimate significantly the actual net increase in population in the 27 catchments subject to Natural England's advice. It is crucial to understand that it is the people within dwellings, and not the dwellings themselves, that produce the nutrients, and that housing supply will not necessarily increase the population living in many areas. Analysis in this report indicates that if one considers the net increase in population based upon an occupancy rate of 1.65 persons per dwelling then the estimated contribution of new housebuilding to nutrient emissions falls further still.

5.5 It is suggested, therefore, that Natural England's advice that housebuilders demonstrate nutrient neutrality in the catchments identified represents a disproportionate restriction on the construction of new homes. In view of the scale of the nutrient emissions from other sources, and the tiny contribution by the occupants of new homes, the requirement for house builders to demonstrate nutrient neutrality will do little to improve the condition of our rivers and associated habitats.

6 Disclaimer

6.1 The conclusions and recommendations contained herein are limited to those given the general availability of background information and the planned usage of the site.

6.2 Third party information has been used in the preparation of this report, which Brookbanks, by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks accepts no liability for same.

6.3 The benefits of this report are provided solely to Home Builders Federation (HBF) only.

6.4 Brookbanks excludes third party rights for the information contained in the report.

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