Nitrogen Reduction in Poole Harbour

Supplementary Planning Document

An implementation plan to achieve nitrogen neutrality from future residential and commercial development across the catchment of Poole Harbour

Consultation Draft – October/November 2015

Borough of Poole

North Dorset DISTRICT COUNCIL

Purbeck District Council

West Dorset District Council

Executive summary

Poole Harbour is an outstanding natural feature on the south coast of England. It provides a resource for a variety of local businesses and port activities. The quality of the natural environment in Dorset makes it an attractive place to live, work and recreate. However, increasing nitrogen levels from sewage and agriculture are contributing to the growth of algal mats in the Harbour, restricting the growth, distribution and variety of important food available for wading birds protected under European law and smothering estuarine habitats.

The majority of nitrogen is generated from agriculture, but a proportion is generated from human sewage. To conform to the requirements of the Habitats Regulations and the Water Framework Directive, local authorities planning for a growth in population have to be certain that development has either avoided harm to European protected sites or mitigated the impact to ensure that there is no adverse effect.

Avoidance is not possible in this case as the population will continue to grow. Therefore the additional nitrogen generated through sewage from new housing development in the catchment of Poole Harbour will have to be mitigated. Mitigation can be 'direct' through upgrading sewage treatment works or 'indirect' by offsetting the nitrogen generated from new development by taking land out of a nitrogen intensive use, e.g. agricultural fields where nitrogen fertiliser is applied. Mitigation measures will need to be applied over the duration over which the development is causing the effects, generally 80-120 years.

The catchment covers five local authorities. Four of these authorities have worked closely with the Environment Agency and Natural England to put together a joint strategy for delivering the necessary mitigation to remove the equivalent of 15.3 tonnes of nitrogen which would be generated by new development annually if un-mitigated by the end of the period 2011-2025. A small part of the catchment falls within East Dorset District, but as it is protected habitat where no development is planned, mitigation is not necessary.

This consultation draft of the supplementary planning document identifies a series of options for mitigating the 15.3 tonnes per year. Around a third of the necessary mitigation is already planned to be delivered in the catchment through indirect offsetting, where land is being taken out of intensive agricultural use and converted to low input uses, such as open spaces, housing, employment and community facilities. This leaves a residual amount of 9.52 tonnes of nitrogen per year for which the local authorities will need to find additional mitigation. The most easily available option to the local authorities is to offset nitrogen through the conversion of agricultural land to low input uses.

Ideally each development should be nitrogen neutral, but often this is only possible for development schemes within a wider land holding such as settlement extensions. Therefore, many developments will be mitigated indirectly through the payment of community infrastructure levy. The four local authorities will be responsible for ensuring that CIL monies are prioritised for projects that provide nitrogen mitigation.

Contents

How to Respond

The Borough of Poole is coordinating this public consultation on behalf of the four local authorities for a period of six weeks from 9 October to 20 November 2015.

Comments can be submitted preferably by email to planning@poole.gov.uk with 'Nitrogen SPD' typed into the subject box. Postal submissions can also be sent to: Planning Policy & Implementation, Planning and Regeneration Services including Building Consultancy, Borough of Poole, Civic Centre, Poole BH15 2RU.

Next Steps

Following the consultation, the local authorities will review the draft SPD in light of the comments received, and will publish a report on the consultation on the websites of each local authority. Each Council will aim to adopt the SPD during 2016.

1. Introduction

1. Poole Harbour is a natural harbour that is designated a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site for its nature conservation importance. The harbour is tidal and is also fed by the rivers Frome (also a SSSI) and Piddle. The catchment of Poole Harbour is illustrated by Figure 1.

2. The recent assemblage of a wide range of scientific evidence indicates that nitrogen (nitrates) in the harbour, through a process known as eutrophication, is encouraging the growth of wide spread algal mats. These mats restrict the growth, distribution and variety of important food (invertebrates) available for wading birds and affect other important features and processes. The presence of algal mats has increased since the 1960s with an expansion from Holes Bay to become widespread across the harbour.

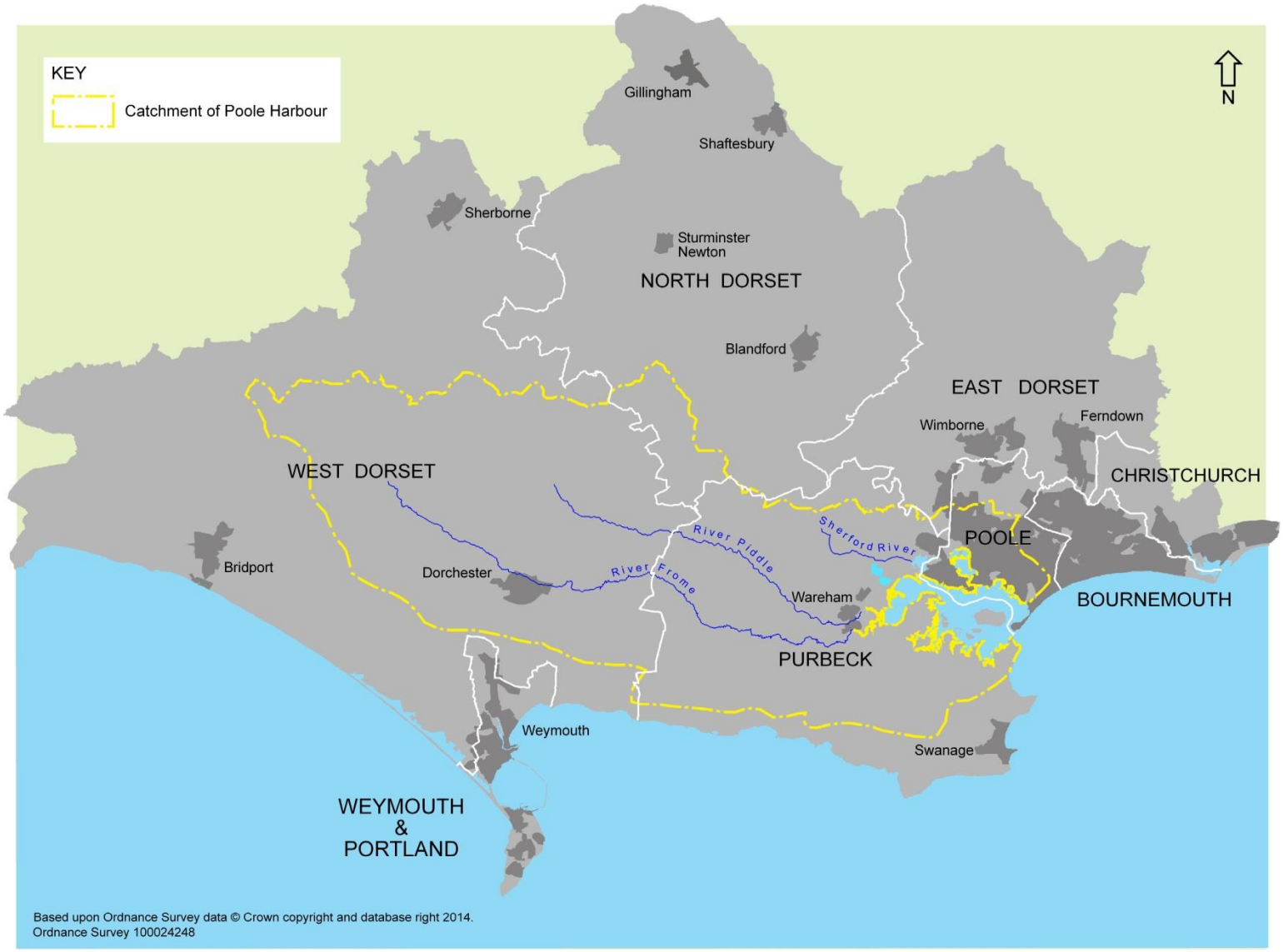
3. Nitrates enter Poole Harbour from inflowing rivers (73%), from the sea (19%) and from direct discharges to the harbour (8%). Nitrogen entering Poole Harbour from the land comes from either a combination of widespread places known as 'diffuse sources', which are mainly losses from agriculture such as nitrogen fertilisers and livestock manure (85%), or from concentrated point sources such as sewage treatment works (STWs) (15%). The time it takes nitrates to reach the harbour from the source varies from very quickly where waste water is piped from STWs to very slowly where nitrates from agriculture percolate through soil into the rivers which takes an average of about 30 years to reach the harbour. In 2009 nitrogen stripping was incorporated in Poole STW reducing the nitrate concentration in the waste water entering the harbour significantly.

4. The primary legislative driver to address the issue of nitrates in Poole Harbour is The Habitats Regulations[1]. Habitats Regulations Assessments (HRAs) for the adopted Poole Core Strategy (2008), Purbeck District Local Plan Part 1 (2012) and the emerging West Dorset and Weymouth Local Plan and the North Dorset Local Plan as well as HRAs for a few large planning applications have highlighted that the increase in population generated by new development will contribute to nitrogen entering Poole Harbour and in-combination with other plans will have an adverse effect upon the integrity of the Poole Harbour SPA/Ramsar unless avoidance or mitigation measures are carried out. In determining the planning applications the competent authorities have been mindful of their duties and secured appropriate mitigation.

5. The Local Plan HRAs recommend that the Councils prepare a policy and strategy for avoiding or, if this isn't possible, mitigating the impact upon the Poole Harbour SPA/Ramsar. In addition any measures brought forward must show that the effects have been mitigated for the duration over which they continue to occur.

1 The Conservation of Habitats and Species Regulations 2010

Figure 1: Catchment of Poole Harbour



6. Poole Harbour is defined as a 'Protected Area' under the Water Environment Regulations[2]. Under the Regulations Poole Harbour is classed as having poor chemical status due to elevated nitrogen concentrations. The objective for Protected Areas is to achieve Good Ecological Status by 2015 where this is technically feasible and would not result in dis-proportionate cost. For Poole Harbour, the Environment Agency and Natural England has recognised that it would not be technically feasible to achieve Good status by 2015, as historic leaching of nitrates across the catchment will take many years to be flushed through the groundwater and into the Harbour, and are therefore considering setting a new deadline.

7. The Environment Agency and Natural England have published a nutrient management plan (NMP), entitled the 'Strategy for Managing Nitrogen in the Poole Harbour Catchment To 2035' (June 2013)[3]. The NMP provides the most comprehensive and up to date scientific knowledge and understanding of the complex underlying processes causing eutrophication. The NMP also sets out different options for reducing nutrients entering Poole Harbour in a sustainable and considered manner. The NMP is flexible in its approach, considering measures across the whole harbour catchment. It recommends that the representatives of the agricultural sector prepare an implementation plan for reducing the impact of nitrates from agriculture. It also recommends that the local planning authorities that share the catchment prepare an implementation plan to ensure that future residential development is nitrogen neutral.

8. This supplementary planning document (SPD) is that implementation plan, providing additional policy context to the following Local Plan policies:

    - North Dorset Local Plan Part 1 (Submission document 2014) - Policy 4:The Natural Environment
    - Poole Core Strategy (2009) Policy - PCS29: Poole Harbour SPA and Ramsar Site;
    - Purbeck Local Plan Part 1: Planning Purbeck's Future (2012) - Policy PH: Poole Harbour; and
    - West Dorset, Weymouth & Portland Local Plan (Submission document, 2013) – Policy ENV2: Wildlife & Habitats.

2 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003

3 http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/research/library/publications/148450.aspx

2. Nitrogen generated by development

Projected growth within the catchment of Poole Harbour

9. This plan starts with the assumption that anyone living in the catchment also works and uses facilities in the catchment, and therefore any sewage generated by that person can be calculated using population growth. Population growth can be linked to planning applications for all forms of new housing. This removes the potential for double counting of human waste water arising from different planning uses. There are exceptions, such as tourism attractions, tourism accommodation and boarding schools that attract people into the catchment and are therefore dealt with differently.

10. The population in the catchment of Poole Harbour is projected to increase by 17,490 people over the period 2011-2025[4], as set out in Table 1:

Table 1 – Population forecasts

District	Forecast population increase 2011-2025
Borough of Poole	14,650
North Dorset District	70
Purbeck District	1,040
West Dorset District	1,730
Total	**17,490**

11. On average each person produces sewage containing 0.0035 tonnes of nitrogen per year (3.5 kilograms)[5]. Assuming this population growth occurs in catchments that feed STWs which meet Urban Waste Water Treatment Directive criteria, Wessex Water who manage the STWs, is required[6] to remove 75% of nitrogen from waste water.

12. The local authorities are required under the Habitats Regulations to avoid harm to the specially protected sites at Poole Harbour. This means those bringing forward plans or projects (e.g. residential development) for consideration must provide mitigation for the additional 25% of the nitrogen entering Poole Harbour from new development that Wessex Water are not required to remove. This residual amount is 0.000875 tonnes of nitrogen per person per year.

13. Forecast population growth of 17,490 people multiplied by 0.000875 kilograms of nitrogen per person per year will generate a total of 15.3 tonnes of nitrogen per year in the catchment of Poole Harbour.

[4] Source: Dorset County Council. Includes target of 9,700 dwellings in the catchment for same period. 17,490 / 9,700 = 1.8 people per dwelling.

[5] AMEC Cumulative Nitrogen and Phosphorus Loading to Groundwater Final Report (22 Nov 2010) Table 7.1 page 36 & 37

[6] Urban Waste Water Treatment Regulations 1994 (Section 5(3))

3. Options for mitigation

14. The mitigation can be achieved in two ways, directly or indirectly. The most direct intervention is for the government to designate the catchment of Poole Harbour (or parts of it) as a Water Protection Zone and ban use of nitrates in agriculture in the catchment. However, this is only likely to be done as a last resort in situations where the Environment Agency is unable to deliver improvements. Other forms of direct mitigation and indirect mitigation are discussed below.

Direct mitigation

15. One option is to improve nitrogen stripping at STWs so that Wessex Water can remove more than its 75% requirement. Poole STW already has a nitrogen stripping facility that can reduce nitrogen concentrations in water discharged to the harbour to <10 milligrams per litre (mg/l) with Wessex Water typically operating the STW with discharge quality of around 7mg/l. It could be further lowered to 5mg/l or nitrogen stripping facilities installed in other STWs in the catchment. However, new facilities are expensive to install and further increases in nitrogen removal at Poole represent only a temporary measure as they would require year on year funding for energy and chemicals in perpetuity and will generate more carbon dioxide.

Indirect mitigation

16. An alternative option is to offset the impact by reducing the equivalent amount of nitrogen that is being spread onto land within the catchment from agriculture. This can be achieved by converting intensive land uses (arable and managed grassland) to low input uses (woodland, rough grazing). This change in land use, to low intensity methods acts as an offset to the additional nitrogen arising from development in the long term. Other land uses may be acceptable as long as fertiliser application is avoided. In addition, land taken out of agricultural use and developed for urban uses (e.g. housing) has a lower rate of nitrate contribution.

17. For ease of calculating and to avoid onerous site assessment Natural England and the Environment Agency recommends using the following conversion rates:

    - 0.0214 tonnes of nitrogen per hectare per year reduction for a change of use of land from a high intensive agricultural use to urban development, (e.g. redevelop an arable field for housing); and
    - 0.0298 tonnes of nitrogen per hectare per year reduction for a change of use of land from agriculture to a low nitrogen input use (e.g. plant an arable field with woodland).

Options for Mitigation

18. The options available are:

	Option
1	All required land comes forward for other uses
2	Increase water bills
3	Designate catchment as Water Protection Zone
4	Change of use of public owned land from agriculture to sparsely treed landscape.
5	Improve the discharge quality at Poole STW from 7mg/l to 5mg/l
6	Introduce nitrogen stripping to Dorchester STW or other over 10,000 resident STWs
7	Purchase of agricultural land and change use to sparsely treed landscape
8	Local conservation body purchases farm holding and over time changes land uses
9	Provide grants for farmers to change land use to commercial woodland

19. These options are discussed in detail in Section 5.

Perpetuity

20. In terms of complying with the Habitats Regulations, mitigation has to be in place for the same period of time as the effect which is arising. For new residential dwellings, occupation of the new dwelling will be in perpetuity, which planning law has defined as either 80 or 120 years. The local authority, acting as a competent authority in approving mitigation must be certain that the mitigation will still be effective and secured for the duration of the impact, effectively for a period of 80 or 120 years. The local authorities can secure mitigation through conditions on a planning permission or the use of covenants.

21. Mitigation in the form of woodland planting generally has a similar life time and is straight forward for the local authority to monitor and ensure that the landowner is complying with the condition/covenant. It is less easy to monitor and secure mitigation where a farmer has agreed to reduce an application of nitrogen, where the changes may not be visibly apparent and hence uncertain.

22. The last few years have seen a surge in planning applications for ground-mounted solar panels in agricultural fields, potentially reducing agricultural nitrogen inputs. Planning permission for these schemes is generally granted for a 25-30 year period. It is not known what will happen beyond this time period, and a change in market value or other factors may mean that panels are removed earlier. There is therefore no certainty that these types of development will endure for 80-120 years and so they cannot be included as mitigation, despite the fact that the land is no longer being used for agriculture. However, the presence of operational solar farms could provide a form of frontloading of mitigation where they act as a buffer in the short term before permanent mitigation is delivered. The operational status of the solar farms and actual extent would need to be confirmed by the authorities.

4. Mitigation already planned

23. The local authorities are already planning to meet some of the 15.3 tonnes annual target. Proposals include local plan allocations for settlement extensions for housing, employment, transport and community uses and Suitable Alternative Natural Green spaces (SANGs). The mitigation must take place within the Poole Harbour catchment, must result in less nitrogen leaching from the land than the previous use, and must provide certainty that the land will no longer be fertilized for 80-120 years. A full list of the sites is set out in:

    - Appendix 1 – Nitrogen neutral developments: these are housing schemes that provide the equivalent amount of mitigation alongside the housing, usually settlement extensions where the landowner has a wider land holding; and

    - Appendix 2 – Other known developments: where the land use will be changed from agriculture to a lower input use. These sites will help meet the mitigation requirements of regeneration and infill development in urban areas, where sites are unable to provide mitigation.

24. Table 2 provides a summary of the mitigation that is already planned and what is still required. Only sites that are rated as having a good or fair chance of delivery within the 2011-2025 timeframe are included.

Table 2: How much mitigation is still required?

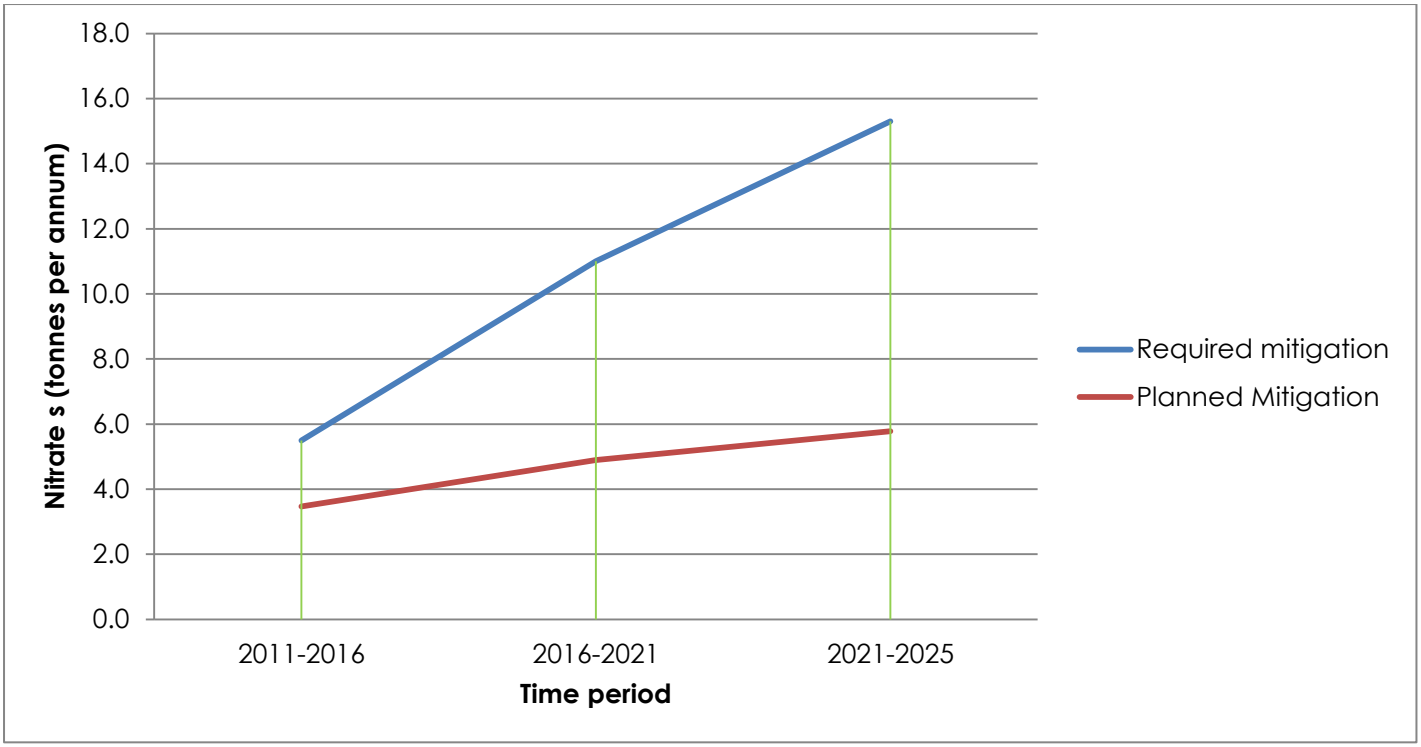
	Total (2011-2025)	Minus : Nitrogen Neutral developments (Appendix 1)	Minus: Other known planned land use change (Appendix 2)	**Mitigation remaining**
Population	**17,490**	3,623	2,982	**10,885 people**
Tonnes of Nitrogen loading per year	**15.3**	3.17	2.61	**9.52 tonnes per year**

25. The local authorities' plans could meet over a third of the mitigation required for the projected growth in population. This mitigation would deliver a reduction of 5.78 tonnes of nitrogen per year which equates to a population increase of 6,605 people or 3,669 dwellings. The Council will need to monitor these proposals to ensure that they are implemented.

26. Figure 2 below and the table in Appendix 3 illustrate the timescales for delivery of mitigation assuming a steady rate of population growth. For 2011-2016 mitigation sites rated as good or fair would account for over half of the required mitigation in that five year period.

27. Mitigation is still required for 9.52 tonnes per year, the equivalent of 10,885 people or 6,047 homes. Other land could come forward over the time frame, e.g. for rural exception housing sites, that reduces the overall amount of land required. Equally population growth may be slower or quicker than forecast.

Figure 2: Timescale for delivery of mitigation



5. Ways of providing the remaining mitigation

28. Options for the delivery of the remaining 9.52 tonnes of nitrogen per annum is set out in Table 3, ordered by price per tonne of mitigation with the lowest first.

29. Further mitigation could come forward for development that takes land out of agricultural use, e.g. rural exception sites, but is unlikely that sufficient land will come forward under Option 1 to achieve the target. Increasing water bills as in Option 2 is not currently planned by the water company, but can be reviewed at a future date. Option 3 requires an Act of Parliament and should only be considered once other options are exhausted. There are insufficient public land opportunities in the catchment to achieve Option 4, but may be able to contribute a proportion of the mitigation. Options 5 and 6 would require nitrate stripping infrastructure installed at STWs before any dwellings are occupied. The up front cost is not feasible as development will come forward and provide contributions towards mitigation over a fifteen year period, and therefore a loan would be necessary. These up front costs are less costly than other options, but there are likely to be significant running costs over a 100 year period. Options 7 and 8 require costly land purchase, but can be delivered in an ongoing basis alongside new housing. Option 9 is the most expensive option due to high maintenance costs.

30. Further mitigation is likely to come forward through options 1 and 4, but it is not likely to be enough to achieve the nitrogen reduction target. The most feasible options currently available are Options 7 and 8 where development is offset by changing the management of agricultural land. These options although costly at the outset, can be delivered piecemeal in tandem with development and have no long term maintenance costs. These options have additional benefits of improving biodiversity and public access to the countryside.

31. The local authorities will continue to monitor the situation to ensure all opportunities are considered throughout the 15 year period. For example, Wessex Water may make improvements to its STWs and future reviews of water bills may provide an opportunity to shift the responsibility for paying for mitigation from the developer to the polluter (each household).

Table 3: Options for reducing nitrogen by 9.52 tonnes per year to mitigate a population increase of 10,885 people

No	Option	Cost per tonne	Cost for 9.52 tonnes over 100 years	Advantages	Disadvantages
1	All required land comes forward for other uses (as in Table 3)	Nil	Nil	• No intervention required • Nil cost	• Unlikely enough land will come forward • Difficult to secure legal agreement to perpetuity (unless owned by local authority or nature conservation body)
2	Increase water bills	Nil	Nil[7]	• Polluter pays • Costs spread out across all households	• Water companies may not agree to surcharge • May not meet Ofwat requirements • Uncertain time scale
3	Designate catchment as Water Protection Zone	Nil	Nil	• Has direct effect on reducing nitrogen usage in catchment • Nil costs (except legal costs)	• Requires Act of Parliament which is an option of last resort
4	Change of use of public owned land from agriculture to sparsely treed landscape.	**£47,681**	**£453,920** plus any costs of buying out tenancies [8]	• No land purchase costs • Biodiversity benefits • Full cost in first 15 years to plant trees, none thereafter.	• May have to buy out tenancy • Is there is sufficient available and suitable publicly owned land? • Other duties incumbent on land owners such as maximising profits on sale/use of land
5	Improve the discharge quality at Poole STW from 7mg/l to 5mg/l	**£190,000**	**£1.53M** plus running costs	• Can be monitored	• Process creates other pollutants. • Only implementable for a short period of year • Requires significant investment up front • Requires more expensive contributions to run in-perpetuity • Does not help resolve pollution affecting R Frome SSSI • Water company may not agree to implement
6	Introduce nitrogen stripping to Dorchester STW or other over 10,000 resident STWs	**£240,000**	**£1.94M** plus running costs	• Can be monitored	• Costly to implement • Requires significant investment up front • Water company may not agree to implement • Requires more expensive contributions to run in-perpetuity
7	Purchase of agricultural	**£539,388**	**£5,134,970** [9]	• Woodland planting may be cost neutral	• May not be enough suitable land available to purchase

[7] There is a cost to all consumers, but no cost for developers

[8] No land purchase costs. £1,600 per hectare to plant trees sparsely. 9.52 tonnes is the equivalent of 283.7 ha (at conversion rate of 29.8). To calculate: 283.7 x £1,600 equals £453,920.

[9] £16,500 per hectare to purchase land plus £1,600 per hectare to plant trees sparsely. Total of £18,100 per hectare for a total of 283.7 hectares

No	Option	Cost per tonne	Cost for 9.52 tonnes over 100 years	Advantages	Disadvantages
	land and change use to sparsely treed landscape.			due to grants. • Biodiversity benefits • No maintenance costs • Provides clear benefits to local residents • Land can be used for other purposes • Full cost in first 15 years to plan trees, none thereafter.	• Who will manage land in future? • Costly initially, cheap in the long run • Onerous to local authorities
8	Local conservation body purchases farm holding and over time changes land uses	**£539,388**	**£5,134,970** [10]	• Biodiversity benefits • Land can be used for other income generating purposes • Full cost in first 15 years, none thereafter	• May not be enough suitable land available to purchase • Costly initially, cheap in the long run
9	Provide grants for farmers to change land use to commercial woodland	**£888,053**	**£8,454,260** [11]	• Work with farming community • Can target least good agricultural land	• Woodland grants already available • Onerous to local authorities • Would there be enough interest? • Not secured in long term

[10] £16,500 per hectare to purchase land plus £1,600 per hectare to plant trees sparsely. Total of £18,100 per hectare for a total of 283.7 hectares

[11] No land purchase cost. £4,800 per hectare to plant trees densely, plus maintenance grant of £250 per hectare per year for 100 years (equates to £25,000 per hectare maintenance grant over the 100 years) Total of £29,800 per hectare for a total of 283.7 hectares.

6. The role of the local authority

32. Each local authority is the competent authority under the Habitats Regulations, responsible for decision making. To grant planning permission for new development that could generate nitrates through waste water each local authority has to be certain that mitigation of any adverse effects upon Poole Harbour is effective and can be secured. Local authorities will do this by monitoring how much housing is being built and ensuring that sufficient mitigation is in place prior to the grant of planning permission. How the local authority does this will vary between local authorities.

33. The way mitigation will be implemented depends upon whether the local authority uses Community Infrastructure Levy (CIL) or a Section 106 Agreement alongside a planning permission[12].

Using Community Infrastructure Levy (CIL)

34. Poole and Purbeck are already operating CIL with North Dorset and West Dorset introducing CIL during 2016. CIL is taxation upon development to contribute to the costs of infrastructure. Improvements to sewage treatment works and offsetting through a change of the use of agricultural land are infrastructure. It is anticipated that the majority of development schemes requiring mitigation will pay CIL, and the local authorities will use the CIL to deliver the mitigation for those developments.

35. Some developments though may be exempt from paying CIL, such as affordable housing and self build developments, or zero rated for CIL such as tourism accommodation in some local authority areas[13]. As such, where these are small scale infill type developments they will be unable to contribute to nitrogen neutrality, but can still be permitted. It becomes the responsibility of the local authority to ensure that this development is mitigated and deliver the necessary amount of mitigation from the overall CIL receipts.

Using Section 106 agreements (S106)

36. A large part of nitrogen mitigation will be delivered through CIL, but in some circumstances local authorities may require a developer to enter into a S106 agreement for all or part of a scheme to secure the requisite mitigation as part of the grant of planning permission. These circumstances are likely to be for (i) strategic housing sites / settlement extensions that are required by policy to be nitrogen neutral and (ii) schemes that are zero rated for CIL (e.g. some large tourism developments). However, legislation dictates that each local authority cannot pool S106 contributions from five or more projects, which limits the application of this approach (unlike CIL). It is likely that each local authority's approach will be different and will be dealt with on a case by case basis[14]

37. Each development subject to a S106 will have to show how the specific development is nitrogen neutral and avoids any adverse harm on Poole Harbour through the provision of

[12] Mitigation would also be required by either of these means if development was carried out under a Neighbourhood Development Order.
[13] Some of the 4 local authorities charge CIL for tourism accommodation some don't.
[14] In Purbeck, in cases where CIL doesn't apply, the preference will be for mitigation measures to be provided directly as part of the development package.

mitigation in perpetuity. Nitrogen neutrality can be calculated by using the examples set out in Appendix 4.

Delivering the mitigation

38. It will be the responsibility of each local authority to ensure that a suitable proportion of the total income from CIL (and any S106[15]) during a financial year is spent on securing the necessary mitigation. The mitigation can be delivered anywhere within the catchment and the local authorities can work together to ensure appropriate delivery. The mitigation needs to be provided before the new development is occupied.

39. The local authorities through their annual monitoring processes will have to manage delivery to ensure that sufficient mitigation is planned to come forward in the catchment to meet the expected delivery of housing over that year. This will be difficult due to the uncertainty of the market in its rates of delivery, highlighted by the recent surge in change of use from office to residential development without the need for planning permission. Local authorities will therefore need to ensure that there is sufficient buffer of front loaded mitigation coming forward. In extreme circumstances the local authorities may have to refuse planning applications for new housing development until such a time as adequate mitigation has been provided.

40. The table below provides a guide for the local authorities to apportion the requisite amount of CIL for mitigation. This mitigation will be top sliced from the overall CIL monies to ensure that mitigation is prioritised. The calculations behind these rates are set out in Appendix 4.

Type of Development	Cost
Dwelling	£956 per dwelling
Room of serviced tourist accommodation[16]	£574 per room
Tourist attraction	£1.45 per annual visit from someone living outside of Poole Harbour Catchment
Boarding School (or similar establishment)	£345 per pupil

41. The local authorities will need to review population projections every five years, to ensure that the basis of the strategy remains accurate. If it is not, the local authorities will need to review the strategy.

[15] Note – no more than five S106 agreements can be pooled and used for one infrastructure project

[16] Serviced accommodation includes hotels, guest houses, bed and breakfasts and self catering holiday chalets and static caravan sites.

Appendix 1: Nitrogen neutral developments within the catchment of Poole Harbour

Plan	Site	Population mitigated	Nitrogen mitigated (Tonnes per year)	Implementation Timescale	Likelihood of meeting timescale
Purbeck Local Plan Part 1	Worgret Road settlement extension, Wareham and East Holme Lane SANGs, Stoborough	275	0.24	2011-2016	Good –SANGs and 153 houses have planning permission (2013). Construction of the housing commenced in 2014. The SANGs will be delivered before first occupation of any dwellings.
Purbeck Local Plan Part 1	Policeman's Lane settlement extension, allotments extension and SANGs, Upton	126	0.11	2011-2016	Good - Allocated site for 70 dwellings. Planning application submitted in June 2014.
WDDC and W&P Local Plan	Poundbury, Dorchester	2142	1.87	2011-2025	Good – Site has planning permission for 2,400 dwellings with 1,190 planned for 2011-2025, remainder by 2031. Estate to be managed as low nitrogen agricultural use.
Subtotal - Good		**2,543**	**2.22**		
Purbeck Local Plan Part 1 & Bere Regis Neighbourhood Plan	Bere Regis settlement extension(s) and SANGs	90	0.08	2011-2016	Fair – 50 dwellings settlement extension set by PLP1. Neighbourhood Plan will allocate site(s) and mitigation. Currently at draft stage with aim to be adopted in 2015. Parish Council currently in negotiations with landowners.
Purbeck Local Plan Part 1	Huntick Road settlement extension, Lytchett Matravers	90	0.08	2011-2016	Fair - 50 dwellings settlement extension allocated in adopted local plan and at pre-application stage. Site of SANGs yet to be agreed.
WDDC and W&P Local Plan	Crossways settlement extension	900	0.79	2016-2031	Fair – 500 dwellings and SANGs allocated in the emerging local plan. Note phasing may continue beyond 2025.
Subtotal - Fair		**1,080**	0.95		
TOTAL		**3,623**	**3.17**		

* Sites not yet identified so for forecasting purposes a notional 2 hectares has been predicted

** Full SANGs is 23ha, but 9 ha is heathland with no existing nitrogen input

Appendix 2: Other known developments that will reduce the nitrogen loading on agricultural land within the catchment of Poole Harbour

Plan	Site	Size (urban)	Size (non urban)	Nitrogen mitigated (Tonnes per year)	Population mitigated	Implementation timescale	Likelihood of meeting timescale
Purbeck Local Plan Part 1	Bere Regis Primary School (relocation)	1ha		0.0467	53	2011-2016	Good – Site has been purchased by Dorset County Council and is no longer being farmed.
Purbeck Local Plan Part 1	New formal open space in Bere Regis		0.8ha	0.0268	31	2011-2016	Good – planning permission granted in 2012 for change of use from agriculture to playing field. Likely to be completed by 2016.
Poole Site Specific Allocations and Development Management Policies	Upton Park Farm SANGs and land within farm tenancy		64ha	2.1477	2,455	2011-2016	Good – Has planning permission (2013) and in ownership of Borough of Poole. Farm tenancy has been ended allowing construction of the SANGs in 2014. Remainder of farm tenancy to be managed as low nitrogen agricultural use from 2014.
Subtotal - Good		**1ha**	**64.8ha**	**2.2212**	**2,539**		
Purbeck Local Plan Part 1 and Bere Regis Neighbourhood Plan	Employment allocation on North Street	1ha		0.0467	53	2016-2021	Fair – Existing allocated site. Likely to be rolled forward as allocated site through emerging neighbourhood plan. No timescale yet from landowner on implementation.
Partial Review of Purbeck Local Plan	Lytchett Minster School playing fields		2ha*	0.0671	77	2016-2021	Fair – School and landowner in negotiations about extension of the school playing fields onto agricultural land.
WDDC and W&P Local Plan	Dorchester Park and Ride site		4ha	0.1342	153	2011-2021	Fair – Proposed park and ride allocation in the emerging local plan
WDDC and W&P Local Plan	Land south of St Georges Road, Dorchester	2ha		0.0935	107	2016-2021	Fair – Proposed housing allocation in the emerging local plan
WDDC and W&P Local Plan	Land off Alington Avenue, Dorchester	1ha		0.0467	53	2016-2021	Fair – Proposed housing allocation in the emerging local plan
Subtotal - Fair		**4ha**	**6ha**	**0.3883**	**443**		
Partial Review of Purbeck Local Plan	Upton Primary School (relocation)	1ha		0.05	53	2016-2021	Poor – aspirational at present. Land may be required to relocate an existing school, but no plans are yet in place.
Partial Review of Purbeck Local Plan Part 1	Between Bere Regis and Lytchett Minster		30ha**	1.01	1,151	2016-2021	Poor – Aspirational at the moment. Only likely to be brought forward if Partial Review allocates a new housing site within the estate that owns most of the land within the area. Size would depend on how

Plan	Site	Size (urban)	Size (non urban)	Nitrogen mitigated (Tonnes per year)	Population mitigated	Implementation timescale	Likelihood of meeting timescale
							much is already woodland, as area is already heavily wooded.
Partial Review of Purbeck Local Plan Part 1	Near Wool		30ha**	1.01	1,151	2016-2021	Poor – Aspirational at the moment. Only likely to be brought forward if Partial Review allocates a new housing site at Wool.
Poole Local Plan (2004) Saved Policy CF1	School north of Upton Road, Poole	2ha		0.09	107	2016-2021	Poor - Site allocated for a new secondary school to be built by 2018, but temporarily discarded in preference of pursuing two alternative sites.
Subtotal - Poor		**3ha**	**60ha**	**2.16**	**2,462**		

* Sites not yet identified so for forecasting purposes a notional 2 hectares has been predicted

** Site not yet identified but estimated area for a large SANGs

Appendix 3: Timescale for delivery of mitigation

The table below sets out the projected timescales for population growth, the necessary mitigation and the currently planned or known mitigation. It is split into 5 year periods and is illustrated by Figure 2 earlier in the document. The table assumes steady population growth and sets out the figures cumulatively from 2011 onwards towards the target of 15.3 tonnes of nitrogen reduction per year by 2025. Only schemes ranked as having a good or fair chance of delivery are included in the planned mitigation, which is taken from Appendices 1 and 2.

Timescale	**Population Growth**	**Required Mitigation (tonnes per year)**	**Planned Mitigation** (rated good or fair) **(tonnes per year)**	**Is the delivery of mitigation on target? (tonnes per year)**
2011-2016	6,246.5	5.5	3.47	-2.03
2011-2021	12,493	11	4.89	-6.11
2011 -2025	17,490	15.3	5.78	-9.52

Appendix 4: Examples of calculations

The following five examples set out different scenarios for calculating mitigation to ensure a development is nitrogen neutral. For simplicity the examples assume that mitigation will be through the purchase of high nitrogen input agricultural land and change of use to low input sparsely treed landscape (Options 7 & 8).

Example A: Calculating the mitigation requirements of a settlement extension

This example is for a 500 dwelling settlement extension on agricultural land with 10 hectare SANGs also on agricultural land:

(Note – only the yellow boxes require an input)

		Multiplier	Sub/Totals
1. Population	Dwellings		
Number of dwellings multiplied by 1.8 additional people per dwelling [17]	500	x 1.8	= 900
2. Amount of nitrogen produced by the development:		25% load (tonnes/ person/year)	Total nitrate load (tonnes/year)
Estimated population of development multiplied by 25% of a person's average annual production of nitrates in sewage[18]	900	x 0.000875	**= 0.7875**
3. Planned land use changes:		Nitrate change (tonnes/ha/year)	Net change in nitrate (tonnes/year)
Calculate a credit where a development can provide its own mitigation:	Hectares		
Site area changing from agriculture to urban	15	x 0.0214	= 0.321
Site area changing from agriculture to low input uses	10	x 0.0298	= 0.298
	Subtotal		**= 0.619**
4. Total amount of nitrogen produced by population growth minus planned land use change			Net change in nitrate (tonnes/year)
Row 2 minus Row 3	0.7875 – 0.619		**= 0.1685**
5. Amount of land required to offset the nitrogen produced:		Nitrate change (tonnes/ha/year)	Land required (ha)
Row 4 divided by net change in nitrates for conversion of agricultural land to low input uses	0.1685	/ 0.0298	**= 5.65**

The example shows that the projected population of 500 dwellings is 900 people. As 75% of the nitrogen will be removed at the sewage treatment works, the development will have to find mitigation to cover the other 25%, which is calculated at 0.000875 tonnes per person per year. The total nitrogen load of the development is 0.79 tonnes per year. The scheme gets a credit for already taking some land out of agricultural use. Firstly the housing will replace 15 hectares of agricultural land and secondly the accompanying 10 hectare SANGs will also replace agricultural land. Combined the housing development and the SANGs generate a credit of 0.62 tonnes per year. This leaves 0.17 tonnes a year that requires mitigation which equates to 5.65 hectares of additional offsetting required.

The landowner has three choices, (i) to increase the size of the SANGs by 5.65 hectares, or (ii) to agree with the local authority to change the farming methods on 5.65 hectares of land in the wider landholding in perpetuity; or (iii) purchase suitable land elsewhere within the catchment and use it for mitigation.

[17] Total population of 17,490 divided by the housing target of 9,700 in the catchment of Poole harbour for the period 2011-2025 equals 1.8 people per dwelling

[18] 25% of a person's annual average nitrogen production through sewage. Water company responsible for remaining 75% of nitrogen.

Example B: Calculating the proportion of CIL required to mitigate a dwelling

The majority of infill/intensification developments will pay CIL and the local authority would use the CIL monies to provide the mitigation. Some developments will be exempt from paying CIL, such as self build dwellings or the conversion of offices to dwellings through permitted development rights. The development must still be mitigated and it will be the responsibility of the local authority to use CIL monies collected from other developments in its area to fund this mitigation. The cost per dwelling can be calculated as follows:

(Note – only the yellow box requires an input).

		Multiplier	Sub/Totals
1. Population	Dwellings		
Number of dwellings multiplied by 1.8 additional people per dwelling	1	x 1.8	= 1.8
2. Amount of nitrogen produced by population growth in catchment:		25% load (tonnes/ person/year)	Total nitrate load (tonnes/year)
Estimated population of development multiplied by 25% of a person's average annual production of nitrates in sewage	1.8	x 0.000875	**= 0.001575**
3. Amount of land required to offset the nitrogen produced:		Nitrate change (tonnes/ha/year)	Land required (ha)
Row 2 divided by net change in nitrates for conversion of agricultural land to low input uses	0.001575	/ 0.0298	**= 0.05285**
4. Financial Cost of mitigating the development		Cost £/ha	Cost
Total offsetting cost based on £18,100 per hectare	0.05285	x £18,100	**= £956**

In this example, the development will produce 0.001575 tonnes of nitrogen per year, which equates to around 0.05 hectares of offsetting or £956 per dwelling.

Annually the local authorities through their monitoring processes would calculate the proportion of mitigation that needs to be delivered from CIL to mitigate the total number of residential completions during the year and then deliver that mitigation.

Example C: Calculating the proportion of CIL required to mitigate serviced tourist accommodation

The assumption is that anyone staying in serviced tourist accommodation is visiting from outside of the Poole Harbour catchment, and the impact of these visits through the generation of additional sewage and consequential nitrate loading, must therefore be mitigated. Serviced accommodation includes hotels, guest houses, bed and breakfasts and self catering holiday chalets and static caravan sites. Evidence[19] points to an average occupancy rate for the South West of 60% of days of the year over the period 2010-13. Therefore mitigation is only required for this period of time.

The calculation differs from the previous examples as it (a) uses bedrooms rather than dwellings and (b) reduces the final sum by 40% for the time unoccupied. For the ease of calculation and consistency, the calculation uses a 1.8 people per room multiplier and all residents are assumed to come from out of catchment.

19 http://www.visitengland.org/Images/December%20%20EOS%20Newsletter_tcm30-40722.pdf

		Multiplier	Sub/Totals
1. Population Number of bedrooms multiplied by 1.8 people per room	Bedrooms 1	 x 1.8	 = 1.8
2. Amount of nitrogen produced by population growth in catchment: Estimated population of development multiplied by 25% of a person's average annual production of nitrates in sewage	 1.8 people	25% load (tonnes/ person/year) x 0.000875	Total nitrate load (tonnes/year) **= 0.001575**
3. Reduction for 60% seasonal occupancy Assumes 60% occupancy over the year	 0.001575	 X 0.65	Total nitrate load (tonnes/year) 0.000945
4. Amount of land required to offset the nitrogen produced: Row 2 divided by net change in nitrates for conversion of agricultural land to low input uses	 0.000945	Nitrate change (tonnes/ha/year) / 0.0298	Land required (ha) **= 0.032**
5. Financial Cost of mitigating the development Total offsetting cost based on £18,100 per hectare	 0.032	Cost £/ha x £18,100	**Cost** **= £579**

In this example, the development will produce 0.000945 tonnes of nitrogen per year, which equates to around 0.032 hectares of offsetting or £579 per bedroom.

Example D: Calculating the proportion of CIL required to mitigate a tourist attraction

As with tourist accommodation above, visitors to attractions will include people from outside of the catchment. It is likely that this form of development will not be CIL liable and the local authority would have to use a S106 to ensure that the development is nitrogen neutral.

The calculation is different to the other examples as it is based upon trips per day, and it discounts visitors who live within the catchment (to avoid any double counting). For ease of calculation the assumption is that each visitor will use the toilet once during their visit, regardless of the length of their visit in that day. Each scheme will have to be dealt with on its own merits. The calculation below assumes that 70% of visitors come from outside of the catchment.

		Multiplier	Sub/Totals
1. Expected total visits to attraction per year	Visits 25,000		Annual visits = 25,000
2. Less visits of people who live within the catchment	 25,000	70% out of area 0.7%	Annual visitors out of area = 17,500
3. Visits per day Assume people visit once a year and use the toilet once per trip	 17,500	Days of year / 365	Daily visitors 47.94
4. Amount of nitrogen produced by the visits: Estimated daily visitors multiplied by 25% of a person's average annual production of nitrates in sewage	 47.94 visitors	25% load (tonnes/ person/year) x 0.000875	Total nitrate load (tonnes/year) **= 0.0419**
5. Planned land use changes:	Hectares	Nitrate change (tonnes/ha/year)	Net change in nitrate (tonnes/year)
Site area changing from agriculture to urban (e.g. visitor centre)	0.1	x 0.0214	= 0.0021
Site area changing from agriculture to low input uses	1	x 0.0298	= 0.0298
	Subtotal		**= 0.0319**
6. Total amount of nitrogen produced by the visits minus planned land use change: Row 4 minus row 5	 0.0419 – 0.0319		Net change in nitrate (tonnes/year) = 0.01
7. Amount of land required to offset the nitrogen produced: Row 6 divided by net change in nitrates for conversion of agricultural land to low input uses	 0.01	Nitrate change (tonnes/ha/year) / 0.0298	Land required (ha) **= 0.336**

In this example, the attraction expects 17,500 visits a year from people who live outside of the Poole Harbour catchment. This equates to 47.94 daily visits. The attraction is taking land out of

agricultural use for the visitor building (0.1ha) and associated land (1ha), which is discounted from the mitigation, leaving a requirement to provide 0.336ha of mitigation land.

If the owner of the attraction did not have a wider landholding upon which to provide mitigation, they may have to provide a financial contribution or secure land as mitigation through S106. Using the example above as the basis, the financial cost would be £25,449[20], which equates to £1.45[21] one off payment to cover each future visit from someone who lives outside of the Poole Harbour catchment.

Example E: Calculating the proportion of CIL required to mitigate residential institutions education accommodation boarding school

This example can be applied to a residential establishment where occupants reside for a proportion of the year, such as a boarding school. Whilst living in the catchment of Poole Harbour the potential impact from the pupil requires mitigation.

The calculation is made on a per pupil basis. As with the previous examples there would be reduction in required mitigation for the holidays when pupils are away. This can be done by multiplying the result by the number of days of term time, which for ease of calculation is around 65% of the year. The calculation assumes that all pupils are from out of the Poole Harbour catchment.

		Multiplier	Sub/Totals
1. No of pupils			= 100
2. Amount of nitrogen produced by population growth in catchment: Estimated population of development multiplied by 25% of a person's average annual production of nitrates in sewage	100 people	25% load (tonnes/ person/year) x 0.000875	Total nitrate load (tonnes/year) **= 0.0875**
3. Term time occupation Assumes pupils attend school 65% of the year	0.0875	Term Time x 0.65%	Total nitrate load (tonnes/year) **= 0.056875**
3. Amount of land required to offset the nitrogen produced: Row 2 divided by net change in nitrates for conversion of agricultural land to low input uses	0.056875	Nitrate change (tonnes/ha/year) / 0.0298	Land required (ha) **= 1.91 ha**

The example shows that a school of 100 pupils generates 0.056875 tonnes of nitrogen a year, during term time, which would require 1.91 hectares of mitigation. Using the example above as the basis, the financial cost would be £345 per pupil[22].

[20] 0.0419 divided by 0.0298 equals 1.406 hectares, required at cost of £18,100, which equals £25,449

[21] £25,449 divided by 17,500 visits equals £1.45 per visit per year.

[22] 1.91 hectares / 100 pupils equals 0.0191 at cost of £18,100, which equals £345