PENCOMBE LANE

BROMYARD

NUTRIENT NEUTRALITY ASSESSMENT AND MITIGATION STRATEGY

GLADMAN

DOCUMENT REFERENCE:

20122-NUT-RP-01 | P01

WATER | ENVIRONMENT

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Authorisation and Version Control

This Nutrient Neutrality Assessment was commissioned by Gladman to investigate and mitigate against the concerns raised by Natural England regarding the nutrient neutrality of the proposed development in Bromyard and the potential adverse effects on downstream designated sites.

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for and on behalf of Water Environment Limited

Document Version History

Rev	Date	Comments	Auth	Chck	Appr
P01	24/02/2022	Draft Issue	CMG	GS	GL

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EXECUTIVE SUMMARY

In 2018, the European Court of Justice refined the definition of plans and projects and ruled that mitigation needs to be in place to ensure that there will be no significant adverse impacts on the conservation status of designated sites. Additional nutrient loading to designated sites already in an unfavourable conservation status is effectively therefore not permissible unless mitigation is in place. This ruling has come to be known as 'The Dutch Case'.

In the River Wye management catchment, developments could adversely affect the River Wye, which is designated a Special Protection Area, that is legally underpinned by several Sites of Special Scientific Interest – including the River Lugg. The River Lugg is a tributary of the River Wye, and its interest features are considered unfavourable from the effects of eutrophication caused by excessive nutrients. Therefore, the ruling of the Dutch Case applies.

All developments in the catchment must demonstrate 'nutrient neutrality' to ensure no adverse effect on the integrity of the designated site, meaning that the nutrients generated by the development must be less than or equal to the nutrients generated by the existing land use.

The application site is 4.73 ha in size and is located on the western edge of Bromyard, a market town in the River Frome Valley in the jurisdiction of Herefordshire Council.

The application is for the erection of up to 120 dwellings with public open space, landscaping, sustainable drainage systems, and vehicular access point.

This Nutrient Neutrality Assessment and Mitigation Strategy calculated the nutrient budget based on the latest Natural England Generic Methodology (March 2022) and catchment-specific calculator for the River Lugg.

The assessment concluded that the development was not nutrient neutral without mitigation. To achieve nutrient neutrality, it was proposed that the nutrient budget be mitigated by the combination of reducing the future surface water nutrient load through the use of SuDS and buying credits from the council-led nutrient mitigation scheme. This proved sufficient, and the site can be considered to have achieved nutrient neutrality through this mitigation strategy.

ABBREVIATIONS

Acronym	Definition
AA	Appropriate Assessment
EA	Environment Agency
EMC	Event Mean Concentration
CSF	Catchment Sensitive Farming
FAWB	Facility for Advancement of Water Biofiltration
HRA	Habitats Regulations Assessment
LPA	Local Planning Authority
NE	Natural England
NEGM	Natural England Generic Methodology
ONS	Office for National Statistics
SAAR	Standard Annual Average Rainfall
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TP	Total Phosphorus
WwTW	Wastewater Treatment Works
WFD	Water Framework Directive

1 INTRODUCTION

1.1 The application site is 4.73 ha in size and is located on the western edge of Bromyard, a market town in the River Frome Valley in the jurisdiction of Herefordshire Council.

1.2 The application is for the erection of up to 120 dwellings with public open space, landscaping, sustainable drainage systems (SuDS), and vehicular access point.

1.3 As the site lies within the catchment of a European and internationally designated site – the River Wye – a Habitats Regulations Assessment (HRA) is required.

Background

1.4 A HRA refers to the several distinct stages of assessment which must be undertaken in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended) to determine if a plan or project may affect the protected features of a habitats site (any site which would be included within the definition at Regulation 8 of the Conservation of Habitats and Species Regulations 2017) before deciding whether to undertake, permit or authorise it.

1.5 A significant effect should be considered likely if it cannot be excluded on the basis of objective information and it might undermine a site's conservation objectives. A risk or a possibility of such an effect is enough to warrant the need for an Appropriate Assessment (AA) to be carried out by the competent authority. 'Appropriate' is not a technical term. It indicates that an assessment needs to be proportionate and sufficient to support the task of the competent authority in determining whether the plan or project will adversely affect the integrity of the habitats site. An AA must contain complete, precise, and definitive findings and conclusions to ensure that there is no reasonable scientific doubt as to the effects of the proposed plan or project.[1]

1.6 In 2018, the European Court of Justice refined the definition of plans and projects in the so-called 'Dutch case' ruling that mitigation needs to be certain at the time of assessment to ensure that there will be no adverse effect on the conservation status of European designated sites which already exceed compliance limits[2].

1.7 Nutrient neutrality is a means of ensuring that a plan or project does not add to existing nutrient burdens. Where nutrient neutrality is properly applied and the existing land does not undermine the conservation objectives, Natural England (NE) considers that an adverse effect on integrity alone and in combination can be ruled out[3].

1.8 In the River Axe, Lugg and Frome operational catchment, developments could adversely affect the River Wye, which is designated a Special Protection Area (SPA) that is legally underpinned by several Sites of Special Scientific Interest (SSSI), including the River Lugg SSSI. The interest features of the River Lugg SSSI are considered unfavourable from the effects of eutrophication caused by excessive nutrients. Therefore the ruling of the Dutch Case applies.

1.9 The practical implication of the Dutch Case across England is the necessity to mitigate increases in nutrient loading from new development including nutrients contained in surface water runoff and an increase in wastewater flows to any of the Wastewater Treatment Works (WwTW) in the relevant catchment.

[1] Guidance on the use of Habitats Regulations Assessment – https://www.gov.uk/guidance/appropriate-assessment – accessed 02/2023
[2] Joined Cases C-293/17 and C-294/17 of the European Court of Justice
[3] Wood, A., Wake, H., and McKendrick-Smith, K. (2022) 'Nutrient Neutrality Principles' Natural England Technical Information Note, TIN186

Scope of Study

1.10 The main objectives of this study are to:

- Provide an overview of NE's position with respect to water quality within the Habitats Site;
- Present calculations, based on the absence of any mitigation measures, to outline the potential increase in nutrient loading as a result of the proposed development; and
- Outline the mitigation strategy proposed to manage surface and wastewater from the proposed development and present supporting calculations to ensure that the proposed development is nutrient neutral from the first occupation of the dwellings.

2 WATER QUALITY IN THE RIVER WYE[4]

2.1 NE has indicated that the River Wye SAC is in poor condition, but only the section that falls within the River Lugg SSSI.

2.2 The River Lugg is a tributary of the River Wye and is designated as a SSSI, which forms part of the wider River Wye SAC. The River Lugg hydrological catchment predominantly covers the north of Herefordshire and includes the catchments of the Rivers Arrow and Frome.

River Lugg SSSI

2.3 The River Lugg SSSI was designated as such in 1995 due to the presence of the following species, which were covered by Council Directive 92/43/EEC on the conservation of natural habitats and wild flora and fauna:

- Atlantic Stream Crayfish *(Austropotamobius pallipes)*
- Eurasian Otter *(Lutra lutra)*
- Atlantic Salmon *(Salmo salar)*
- Bullhead *(Cottus gobio)*
- Twaite Shad *(Alosa fallax)*
- Brook Lamprey *(Lampetra fluviatalis)*

2.4 The condition of all four units within the SSSI is noted as 'unfavourable', with unit 003 in particular noted as 'unfavourable – declining'. There is an ongoing investigation into the causes of this decline.

River Wye

2.5 The River Wye SSSI is designated for the following features of interest:

- The Eurasian otter *(Lutra lutra)* is widespread along the length of the river where appropriate bankside cover exists. Water voles *(Arvicola terrestris)* can be found along the middle sections of the river, and the bankside tree cover provides feeding and roosting habitats for several bat species;
- A wide range of migratory and non-migratory fish species, including Atlantic Salmon and the very rare Allis shad *(Alosa alosa)*;
- A varied assemblage of breeding birds associated with rivers;
- Varied invertebrate fauna, in particular, the riffle beetle *(Normandia nitens)* and the shingle beetle *(Neobisnius proxlixus)*; and
- A large collection of submerged flowering, marginal and bankside plants. The nationally scarce horse-tail *(Equisetum x littorale)* is found in the upper section of the river.

2.6 The River Wye SAC is designated for the following qualifying features:

- Water courses of plain to montane levels with R. Fluitantis
- Transition mires and quaking bogs

[4] Designatedsites.naturalengland.org.uk (Accessed 02/2023)

- Freshwater crayfish
- Sea Lamprey
- Brook Lamprey
- River Lamprey
- Allis Shad
- Twaite Shad
- Atlantic Salmon
- Bullhead
- Eurasian Otter

2.7 The focus of this letter is on the evidence of degrading water quality in the River Lugg SSSI of the River Wye SAC, henceforth referred to as the 'Habitats Site'.

Nutrients of Significance

2.8 It has been found that the nutrient of the highest significance in terms of water quality in the Habitats Site is Total Phosphorus (TP).

2.9 TP includes all phosphorus components – phosphate phosphorus (PO_4-P), dissolved organic phosphorus and particulate phosphorus in algal and bacterial cells – and also includes mineral particles such as clay.

Water Quality

2.10 The condition of the Habitats Site which supports the designated features is in part dependent on the water quality within them. The occurrence of excessive nutrients in the Habitats Site can impact the competitive interactions between high plant species, and between higher plant species and algae, which can result in dominance in attached forms of algae, and a loss of characteristic plant species.

2.11 Changes in plant growth and community composition can have implications for the wider food web and the species present. Increased nutrients and the occurrence of eutrophication can also affect the dissolved oxygen levels in the waterbody, which can also impact the biota within the Habitats Site.

2.12 There is evidence of poor water quality within the River Lugg SSSI which is adversely affecting the aforementioned qualifying features of each designated site.

Strategic Approach

2.13 Where sites are already in unfavourable condition due to elevated nutrient levels, NE considers that competent authorities will need to carefully justify how further inputs from new plans and projects, either alone or in combination, will not adversely affect the integrity of the site given the conservation objectives.[5]

2.14 To address the uncertainty and the subsequent risk to the Habitats Site, the mitigation strategy outlined in this report will ensure that the proposed development does not add to existing nutrient burdens and provides certainty that the whole of the scheme is deliverable in line with the

[5] Natural England (16 March 2022) Letter to LPA Chief Executives and heads of planning 'Advice for development proposals with the potential to affect water quality resulting in adverse nutrient impacts on Habitats Site.'

requirements of the Conservation of Habitats and Species Regulations 2017[6] and in light of relevant case law[7].

2.15 The latest NE guidance has been followed to ensure that the proposed development will be nutrient neutral (i.e. will not increase the flux of nutrients to the designated site).

2.16 In this report the following staged approach has been implemented: in Part 1, it was calculated, in the absence of any mitigation measures, the potential increase in nutrient loading from the proposed development. In Part 2, a mitigation strategy was proposed and supporting calculations have been presented which provide sufficient and reasonable certainty that the development will not contribute to an increase in nutrient loading.

2.17 The nutrient neutrality calculations in this report were based on key inputs and assumptions based on the best available scientific evidence and research. To accommodate for the necessary level of uncertainty in these key assumptions, a buffer has been used when calculating levels of nutrients. This buffer ensures that a precautionary approach is followed throughout.

[6] Conservation of Habitats and Species Regulations (England and Wales) Regulations 2017
[7] Including Wildlife and Countryside Act 1981, Countryside and Rights of Way Act 2000 and Rural Communities Act 2006

3 SITE DESCRIPTION

Location

3.1 The application site is 4.73 ha in size and is located on the western edge of Bromyard, a market town in the River Frome Valley, in the jurisdiction of Herefordshire Council.

3.2 The site boundary and location with respect to the Habitats Site are shown in Figure 1. The site is located in the Arrow, Lugg and Frome Operational Catchment, and is currently in use for agriculture.

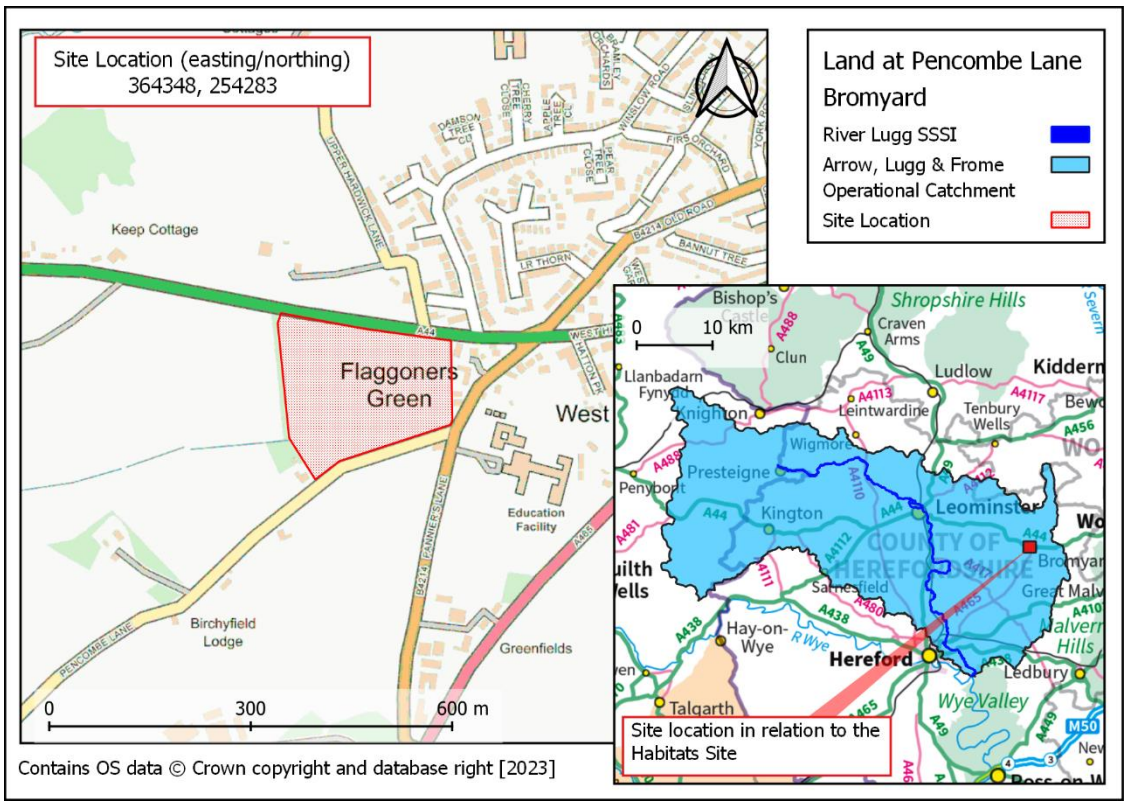


Figure 1: Location of Site

Proposed Development

3.3 The application is for the erection of up to 120 dwellings with public open space, landscaping, SuDS, and vehicular access point.

3.4 Drawings of the proposed scheme are attached in Appendix A.

4 PART 1: CALCULATING THE NUTRIENT BUDGET

Natural England Methodology

4.1 The latest version of the Natural England Generic Methodology (NEGM) for determining whether a site achieves nutrient neutrality was issued in March 2022[8]. This guidance lays out the process of calculating the nutrient budget and provides worked examples.

Stage 1 – Total Wastewater Load

4.2 Stage 1 of the calculation is to calculate the nutrient load from the additional wastewater that will be generated by the development. This stage specifically only includes new overnight stays in the development, as it is assumed that any additional wastewater generated by diurnal use would be accounted for elsewhere.

4.3 This is done by multiplying the total amount of wastewater by the expected concentration of treated effluent from the WwTW serving the development. The WwTW can be determined through an enquiry from the wastewater service provider in the development location.

4.4 NE guidance recommends using water use as a proxy for total wastewater amount, excluding any garden use. NE's advice is to use the Building Regulations to determine the average water use per person, and then to add 10 litres/person/day (l/p/d) to the value to account for uncertainty in any future changes to fittings.

4.5 The increase in the number of people from a development can be determined through the use of census data from the Office for National Statistics (ONS). This gives the average occupancy of a dwelling type, and NE recommends the use of the national average occupancy rate to determine the expected population.

Stage 2 and Stage 3 – Existing and Future Surface Water Loads

4.6 Stage 2 of the calculation is to consider the existing land use on the site, and Stage 3 is to consider the future land use onsite. Using the ADAS Farmscoper tool, loading factors can be determined for all different agriculture uses within the catchment. These loading factors are further separated by the underlying soil drainage conditions and average rainfall and are measured in kg/ha/year.

4.7 In the NEGM, evidence suggested that non-agricultural, non-urban land uses do not leach TP. It was therefore conservatively assumed that woodland, greenspace, and similar land uses would leach TP at the limit of detection which, in some studies, was 0.02 kgP/ha/year.

4.8 In the NEGM, urban loading factors were modelled using assumed[9] 'event mean concentrations' (EMC) of nutrients for rainfall events. The average runoff for a site can be calculated using the Modified Rational Method and multiplying the runoff by the EMC will give the nutrient load. This has been standardised for a 1 ha site so that a loading factor can be obtained in the same units of measurement as for agriculture and greenspace.

4.9 Using these loading factors, and the area of various land uses on the site, the existing and future nutrient load from diffuse sources can be calculated.

[8] Ricardo and Natural England (February 2022) Nutrient Neutrality Generic Methodology
[9] The latest NE methodology quotes 'Mitchell, G., 2005. Mapping hazard from urban non-point pollution: A screening model to support sustainable urban drainage planning. Journal of Environmental Management, 74(1), pp. 1-9' in the definition of the so-called 'event mean concentrations'. However, the paper does not disclose how the event mean concentrations listed were calculated.

Stage 4 – Final Unmitigated Nutrient Budget

4.10 Stage 4 of the calculation is the final stage. At this point, the totals from Stage 1 and Stage 3 are added together, and the total from Stage 2 is subtracted. If there is a surplus (i.e., the proposed total is higher than the existing total), a buffer (factor of safety) of 20% is added to the total, and this is then referred to as 'the nutrient budget'. If the nutrient budget comes out as less than or equal to zero, then the development has achieved nutrient neutrality.

4.11 All the calculations set out in this section can be seen in full in Appendix B of this report.

Development Nutrient Load from Additional Wastewater

4.12 The primary source of nutrients from residential development is usually domestic wastewater. Typically, wastewater is conveyed from development to the public sewerage and onto the WwTW for treatment before discharge to surface waters.

4.13 Wastewater from the site will be conveyed to Bromyard WwTW, which has a TP licence limit of 1 mgP/l. Therefore, in line with the NEGM, a value of 0.9 mgP/l was used.

4.14 It was agreed with Herefordshire Council that the occupancy rate to be used for the development is 2.3. This gives a future population of 276.

4.15 The site will meet a higher standard for water use of 100 l/p/d. In line with the NEGM, an additional 10 l/p/d has been added. Therefore, a water use of 110 l/p/d has been used in the calculations.

4.16 Using the information above, a wastewater nutrient load of 9.98 kgP/year has been calculated for the proposed development scheme.

Development Nutrient Load from Land Use Change

4.17 The site is within the Arrow, Lugg and Frome Operational Catchment and lies within the Hereford England Groundwater Nitrate Vulnerable Zone.[10] The HR Wallingford Greenfield Runoff Tool[11] gives a standard average annual rainfall (SAAR) of 714 mm, and Cranfield University's SoilScapes tool[12] indicates that the soil onsite is classed as 'Slightly Impeded'.

4.18 The site currently has two uses onsite: growing cereal crops and lowland grazing. The total areas and leaching rates for both uses are as follows:

- Cereals: 3.92 ha at a leaching rate of 0.64 kgP/ha/year
- Lowland Grazing: 0.81 ha at a leaching rate of 0.22 kgP/ha/year

These land uses have been taken from the Gladman Existing Land Use Plan, which is attached to this report in Appendix A. The total nutrient load from existing land use is therefore 2.70 kgP/ha/year.

4.19 The proposed land uses with their associated leaching rates are as follows

- Residential Urban: 3.48 ha with a leaching rate of 1.45 kgP/ha/year
- Greenspace: 1.13 ha with a leaching rate of 0.02 kgP/ha/year
- Water: 0.13 ha with a leaching rate of zero.

[10] https://mapapps2.bgs.ac.uk/ukso/home.html?layers=NVZEng [accessed 01/2023]
[11] Available at: Uksuds.com [Accessed 01/2023]
[12] Available at: http://www.landis.org.uk/soilscapes [Accessed 01/2023]

These areas have been taken from the Gladman Proposed Land Uses drawing, which is attached to this report in Appendix A. The site, therefore, has a future surface water nutrient load of 5.07 kgP/year.

The Nutrient Budget

4.20 The future nutrient loading for the proposed development, as a result of increased wastewater and future land use, comes to 15.05 kgP/year and exceeds the existing nutrient load by 12.35 kgP/year.

4.21 Including the recommended 20% buffer, these calculations set the 'nutrient budget' for the proposed development to 14.82 kgP/year.

4.22 The following section outlines the proposed mitigation strategy for the reduction of this additional nutrient loading to zero, i.e. to establish nutrient neutrality.

5 PART 2: MITIGATION STRATEGY

5.1 As the development will increase the nutrient load, mitigation will be required to achieve nutrient neutrality. The mitigation strategy presented in this section has been designed to reduce the nutrient budget to zero.

5.2 All calculations for the proposed mitigation strategy are included in full in Appendix B of this report.

Offsetting through Council-led Nutrient Mitigation Scheme

5.3 Through application to Herefordshire Council, the development has managed to obtain nutrient credits to the value of 11.82 kgP/ha/year. This will be provided through an integrated wetland scheme led by the council to provide nutrient credits.

5.4 Therefore, to achieve nutrient neutrality, the nutrient budget for the site will only need to be reduced to 11.82 kgP/ha/year.

Reduction in Nutrient Load through use of Sustainable Drainage Systems

5.5 The use of SuDS will reduce the leaching rates from the future urban land use. By reducing the future nutrient load from the urban portions of the site by 50%, nutrient neutrality can be achieved.

5.6 CIRIA's guidance for using SuDS to reduce TP load in surface water (C808) provides reduction rates for various types of SuDS. Without accounting for infiltration, the highest level of TP reduction that can be achieved under this guidance is 84.5% using a stormwater filter with appropriate adsorption media. A retention basin, much more commonly used, can achieve a TP reduction rate of 50% alone.

5.7 The use of a SuDS train would be general good practice for drainage design, and would allow the TP reduction to be increased to much higher levels, however, that is beyond the scope of this report.

5.8 It is proposed that an appropriately worded condition is applied to the development, requiring that the drainage for the site includes SuDS which can achieve at least a TP reduction rate of 50%. If a rate above this is achieved, then there will be a nutrient benefit, which could be used to offset other developments within the catchment.

Summary of Mitigation Strategy

5.9 The unmitigated nutrient budget has been reduced to zero through a combination of the use of SuDS and the council-led mitigation scheme.

6 CONCLUSIONS

6.1 Following the procedure outlined in the latest NE guidance it has been demonstrated, through the implementation of the proposed mitigation strategy, that the proposed development will not have a significant adverse impact on the Habitats Site.

6.2 The nutrient budget will be mitigated through the combination of reducing the future surface water nutrient load through the use of SuDS and buying credits from the council-led nutrient mitigation scheme.

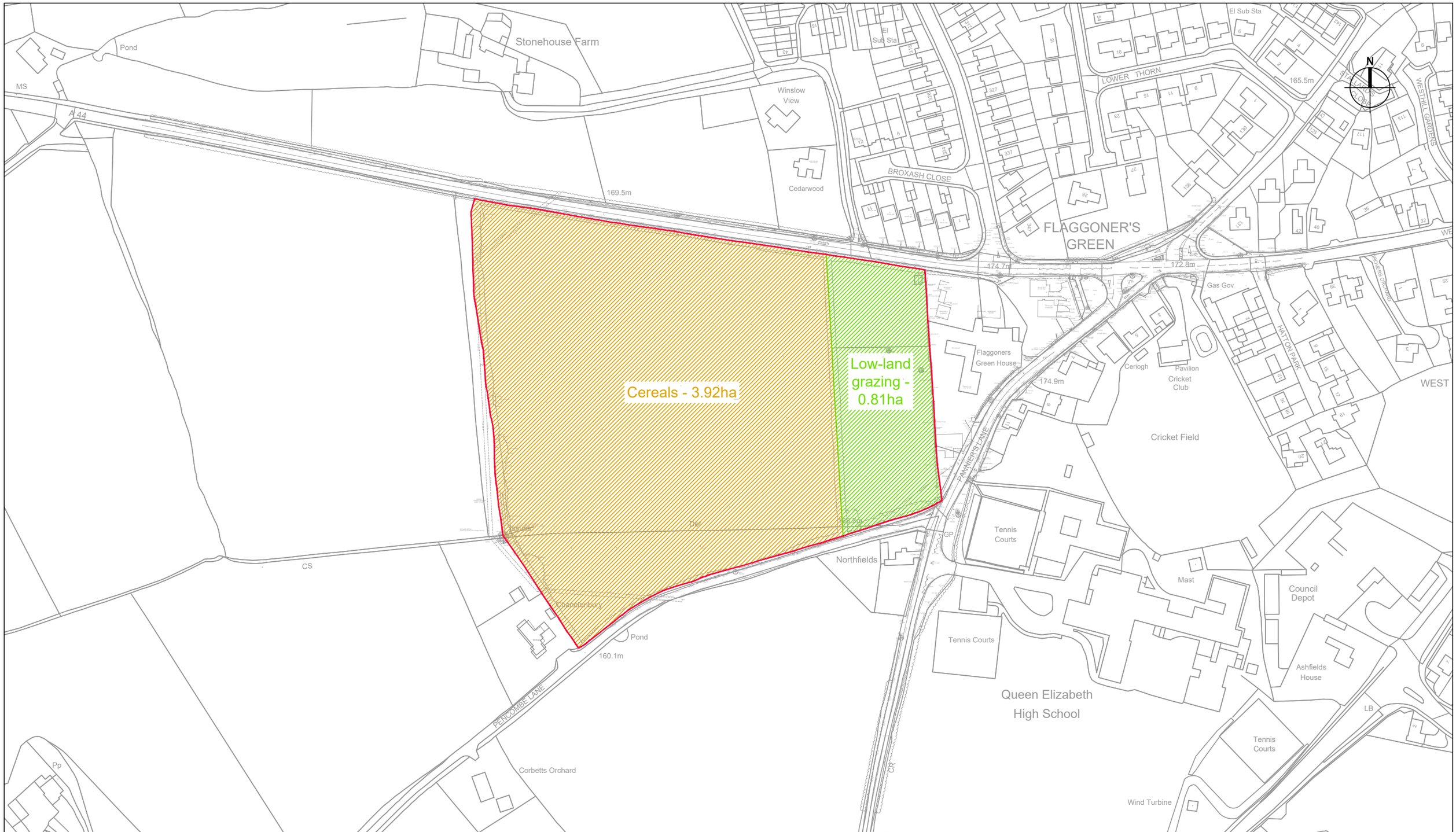
6.3 A SuDS strategy will be designed and implemented in line with guidance to achieve nutrient reductions of at least 50% for TP. This is achievable under CIRIA Guidance (C808), and the design of a detailed treatment train is beyond the scope of this report.

6.4 The SuDS elements of the strategy will be maintained according to the appropriate maintenance schedule as listed in the CIRIA SuDS Manual C753 to ensure that they will operate as expected in perpetuity.

APPENDIX A: DRAWINGS

Existing Land Use Plan: Gladman dwg no. 2018-044 NN 001 rev A

Proposed Land Use Plan: Gladman dwg. no. 2018-044 NN 002 rev A



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Rev	Date	By	Revision notes
*	*	*	*

Status

PRELIMINARY

Project

BROMYARD, PENCOMBE LANE

Title

Existing Land Use Plan

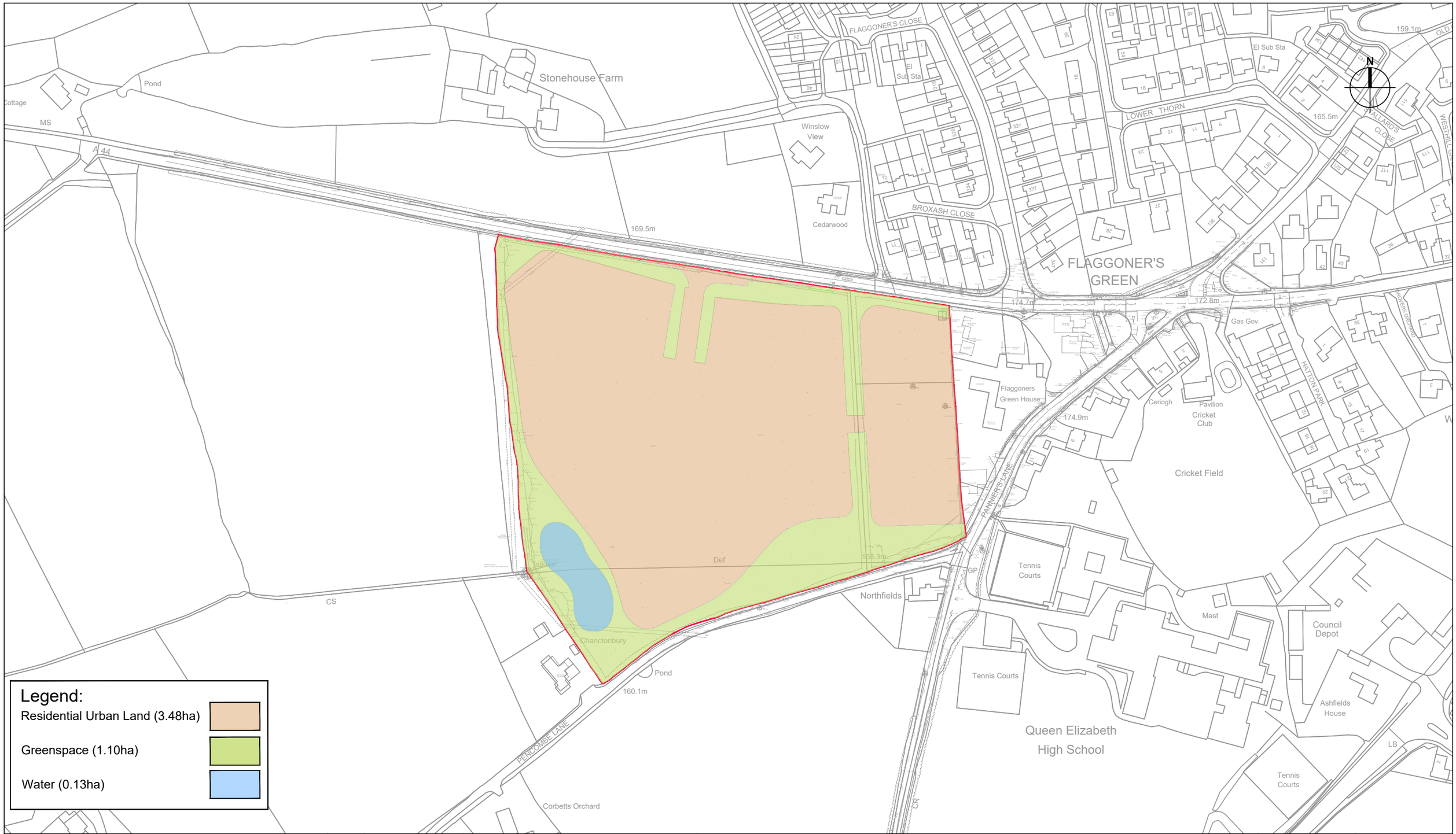
Drawn by MJH	Issue date 21-11-22
Title checked by EJH	Title checked date 27-04-18
Highways checked by EJH	Highways checked date 27-04-18
Topo checked by EJH	Topo checked date 27-04-18

Scale(s)

1 to 2000 @ A3L

Drawing No

2018-044 NN 001 rev A



Legend:

- Residential Urban Land (3.48ha)
- Greenspace (1.10ha)
- Water (0.13ha)

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Rev	Date	By	Revision notes
*	*	*	*

Status

PRELIMINARY

Project

BROMYARD, PENCOMBE LANE

Title

Proposed Land Use Plan

Drawn by: MJH	Issue date: 21-11-22
Title checked by: EJH	Title checked date: 27-04-18
Highways checked by: EJH	Highways checked date: 27-04-18
Topo checked by: EJH	Topo checked date: 27-04-18

Scale(s): 1 to 2000 @ A3L

Drawing No: 2018-044 NN 002 rev A

APPENDIX B: CALCULATIONS

Unmitigated Nutrient Neutrality Calculations

Mitigated Nutrient Neutrality Calculation

Unmitigated Nutrient Neutrality Calculations

Job No.	20122	
Job Name	Pencombe Lane, Bromyard	
Engineer / Initials	Christopher Garrard	CMG
Checked by / Initials	Gareth Snyman	GS
Date	24/02/2023	

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Standard Average Annual Rainfall (mm)	714	Soil Type	Slightly Impeded Drainage
Nitrate Vulnerable Zone	TRUE	Catchment	Arrow, Lugg & Frome

Stage 1 - Total Nitrogen (TN) and Total Phosphorus (TP) Load from Development Wastewater

Measurement	Value	Unit	Explanation
New Dwellings	120	number	
Average Occupancy	2.3	persons/dwelling	
Future Population	276.0	persons	
Water Use	110	litres/person/day	
TP Licence Limit	1.00	mg/l	
Future Wastewater Nutrient Load	**9.98**	**kgP/yr**	

Stage 2 - Calculation of Existing Nutrient Load from Surface Water

Existing Land Use	Existing Area (ha)	Leaching Rates (kg/ha/year) TP	Explanation
Cereals	3.92	0.64	
Lowland	0.81	0.22	
Existing Surface Water Nutrient Load	**2.70**	**kgP/yr**	

Stage 3 - Calculation of Future Nutrient Load from Surface Water

Future Land Use	Proposed Area (ha)	Leaching Rates (kg/ha/year) TP	Explanation
Urban Land Uses			
Residential Urban	3.48	1.45	
Reduction factor due to SuDS		0%	
Urban Nutrient Load (kg/year)		5.05	
Non-Urban Land Uses			
Greenspace	1.13	0.02	
Water	0.13	0.00	
Non-Urban Nutrient Load (kg/year)		0.02	
Future Surface Water Nutrient Load	**5.07**	**kgP/yr**	

Stage 4 - Calculation of TN andTP Budgets

Measurement	Value	Unit	Explanation
Total Future TP	15.05	kgP/yr	
TP Budget	12.35	kgP/yr	
Nutrient Budget with 20% Buffer	**14.82**	**kgP/yr**	

Mitigated Nutrient Neutrality Calculations

WATER | ENVIRONMENT
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Job No.	20122	
Job Name	Pencombe Lane, Bromyard	
Engineer / Initials	Christopher Garrard	CMG
Checked by / Initials	Gareth Snyman	GS
Date	24/02/2023	

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Lowland	0.81	0.22	
Existing Surface Water Nutrient Load	**2.70**	**kgP/yr**	

Stage 3 - Calculation of Future Nutrient Load from Surface Water

Future Land Use	Proposed Area (ha)	Leaching Rates (kg/ha/year) TP	Explanation
Urban Land Uses			
Residential Urban	3.48	1.45	
Reduction factor due to SuDS		50%	
Urban Nutrient Load (kg/year)		2.52	
Non-Urban Land Uses			
Greenspace	1.13	0.02	
Water	0.13	0.00	
Non-Urban Nutrient Load (kg/year)		0.02	
Future Surface Water Nutrient Load	**2.55**	**kgP/yr**	

Stage 4 - Calculation of TN andTP Budgets

Measurement	Value	Unit	Explanation
Total Future TP	12.53	kgP/yr	
TP Budget	9.82	kgP/yr	
Nutrient Budget with 20% Buffer	**11.79**	**kgP/yr**	