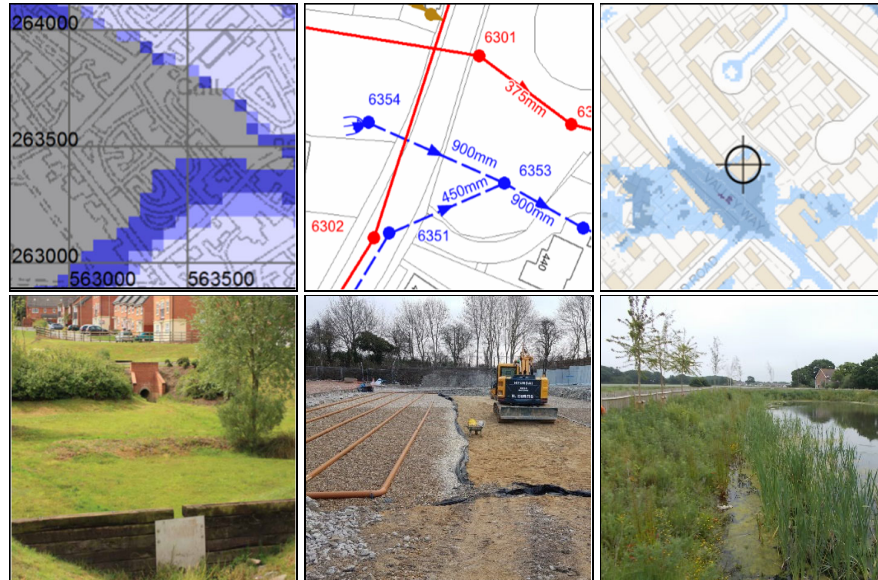




Nutrient Assessment & Budget

Manor Farm, Collingbourne Kingston, Wilts

Reference: 24124

Issue: **Date:**

1	17/9/2024	To NE 16/03/2022 methodology with replacement NE calculator August 2024
2	10/6/2025	Scheme plan updated and reassess to replacement calculator May 2025

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C	Nutrient Assessment & Mitigation
D	Conditions & Limitations

1. Introduction

- 1.1 Instructions were received from Fowler Architecture and Planning to undertake an assessment of the nutrient impact for the development of 1 dwelling for the dairy farm manager at Manor Farm, Collingbourne Kingston, Wilts.
- 1.2 This assessment has been undertaken by A P Traves BSc CEng MIStructE MCIHT.
- 1.3 The client's attention is drawn to the conditions and limitations contained in Appendix D.

2. Development Description & Location

- 2.1 The site comprises 0.15 ha of dairy herd farm at Manor Farm, Collingbourne Kingston, Wilts. The site extents are indicated on Fowler Architecture and Planning block plan 240204-05-A contained in Appendix A of this report.
- 2.2 It is proposed develop 1 dwellings for the dairy farm manager. The proposed layout is identified on Fowler Architecture and Planning site plan 240204-06-A contained in in Appendix A of this report.

3. Background to Nutrient Assessment

- 3.1 The background to the issue is set out in current Natural England- Nutrient Neutrality Generic Methodology dated 1 February 2022 (NE-gen1). NE- gen1 was issued to LPAs on 16 March 2022 and the calculator was replaced in January 2024 to take account of upgrade of public Wastewater Treatment Works (WwTW) defined by the Levelling Up and Regeneration Act 2023. The calculator was replaced again in May 2024 then August 2024 and again in May 2025 to reflect further scheduling from the Levelling Up and Regeneration Act 2023.
- 3.2 The Hampshire Avon Special Area of Conservation (SAC) is is protected under the Water Environment Regulations and the Conservation of Habitats and Species Regulations. There are high levels of phosphorus nutrients in these waters and the evidence indicates these nutrients are causing eutrophication of the waters (excess mats of dense green algae which deplete oxygen as these subsequently decay)
- 3.3 The total nutrient content comes from a number of component parts:
 - i. Agricultural use of fertilisers, particularly in the latter half of the 20th century
 - ii. General coastal background content
 - iii. Nutrient within final discharge from sewage treatment works
 - iv. Diffuse urban rainfall runoff from urban surfaces
- 3.4 Since the late 1980's and early 1990's the agricultural sector has reduced the nutrient content in applied fertiliser by around 35%. However, the Chalk aquifers which underly the region and which are the dominant source of river flows into The Solent contain a massive amount of legacy nitrogen mainly in the form of soluble nitrate, from decades of previous agricultural practice. It is anticipated that it will take decades from now for the nutrient content in groundwater to gradually reduce.
- 3.5 It has been recognised by the Environment Agency, water companies and OFWAT for some time that improvement of the Total Phosphorus (TP) content of discharge needs to be addressed. The water industry works in 5 year spending cycles/programmes referred to as Asset Management Plans (AMPs) and these three parties agree between them how much investment (which comes from increases in sewage bills) can be made in any AMP and what will be delivered in terms of improvement for the investment permitted (affordable). It is not practicable to strip 100% of the Phosphorus from the sewage, and the previously upgraded treatment works typically operate to a new TP permit level of around 1 mg/L compared to typical value of around 8 mg/L for traditional works without TP permit limits.

- 3.6 Treatment works upgrades are difficult and complex to plan and deliver in the context of three of the main constraints:
- There is little space at most works for the finished new infrastructure
 - The existing works has to continue to operate during the upgrade and there is little room for this and the working space needed to construct the new infrastructure.
 - The investment cashflow is regulated by OFWAT against bill increases and notwithstanding this there are a finite number of specialists to plan and deliver this so there can only be a limited rate at which the upgrades are delivered.
- 3.7 The introduction of WwTW upgrades through the Levelling Up and Regeneration Act 2023 appears to have been programmed to match the AMP cycle in that the initial tranche of upgrades have been scheduled in January 2024 which coincides with Price Review 2024 (PR24) in which OFWAT and the water industry agree the AMP8 2025-2030 works programme. The initial tranche of upgrades now required have to be delivered by 2030 which coincides with the end of the AMP8 period. It seems likely that the Secretary of State would in future review and update scheduling in the year preceding the next PR ie in 2028 for PR 2029 as the Levelling Up and Regeneration Act requires a minimum period of 7 years allowed for upgrades from scheduling which would coincide with the period of the impending AMP at that time ie AMP9 2030-2035.
- 3.8 The NE-Avon-v1 methodology is aimed at planning permissions for proposed developments and does not address agricultural practice or the water industry AMP process. The NE-Avon-v1 methodology is built off a single fundamental premise. This assumes that persons at work or using non-residential offices and commercial/retail premises must also live in the catchment. In the round this is a reasonable basis on which to look at the total sewage volume. However in zero rating commercial development from phosphorus loading it inherently means that residential developers fund the Phosphorus nutrient mitigation of all non-residential commercial development in the region.
- 3.11 Natural England nutrient assessment methodology NE-Avon-v1 considers phosphorus for:
- 1) Land use with regard to phosphorus contained in surface water run-off and infiltration.
 - 2) Sanitation with regard to nutrient content in the final treated discharge from the WwTW serving the development.
- The assessment compares pre and post development quantities on nutrient for the land use (1) and sanitation (2) to establish a final figure and then adds a 20% buffer to this.
- 3.12 Natural England advise the NE-Avon-v1 methodology is advised for all types of development that would result in a net increase in population served by a wastewater system, including new houses, student accommodation, tourism attractions and tourist accommodation.

4. Derivation of Sewage Load

- 4.1 The NE-Avon v1 methodology used a blunt 2.4 average household occupancy and 110 litres per person per day (LPD) for housing.
- 4.2 NE-Avon-v1 now recognises that water consumption on sites varies:
- Building Regulations maximum 125 LHD
 - Building Regulations higher standard 110 LHD
 - Higher standard by water efficiency calculation
- NE-gen1 directs that the level of proposed water usage is increased by 10 LPD *“to account for changes to less water efficient fittings through the lifetime of the development”*. This direction is contrary to the industry direction of travel, Southern Water’s own water supply policies which NE recognise in their February 2022 advice note regrading water neutrality within the Sussex North Water Supply Zone and associated Frequently Asked Questions document (December 2021) in which this demonstrates explicit awareness of Southern Water’s Target 100 *“to reduce water consumption in Southern Water’s whole water supply*

area in the long term (not just Sussex North), as set out in their Water Resources Management Plan.” The evidence therefore points to a long term reduction in use NOT a long term increase.

- 4.3 There is a further fundamental error in that sewage load is less than not equal to water use. Water efficiency calculations include a 5 LPD for external use that is not returned to the sewer so does not form part of the sewage load. In water metered properties sewage bills are calculated at 95% of the water supply volume in recognition of this.
- 4.4 The calculations attached to this report have been undertaken on the basis of 110 LPD unless a water efficiency calculation has been provided to us and is attached. A +10 LPD has been added as directed by Natural England. The liability and accountability for the impact of this direction rest with Natural England as current evidence set out in 4.2 and 4.3 above indicates their current approach is unsound.

5. Wastewater Treatment Works

- 5.1 The site is remote from the public sewer.
- 5.2 The applicant proposes to install a Graf One2Clean (biological) treatment plant (PTP) which has a confirmed performance for TP of 1.6 mg/L. The subsequent nutrient assessment calculations are based on use of Graf One2Clean (biological) treatment plant. The associated performance certification is contained in Appendix B.

6. Land Use Component

- 6.1 The site comprises 0.15 Ha of dairy herd land. There will be some change in nutrient from the land use component as a result of the proposed development.
- 6.2 The applicant does not propose to use SUDS to provide a reduction in the post development figure from the base calculation load in surface water runoff to which 6.1 relates. This part of the calculator is therefore not applicable.

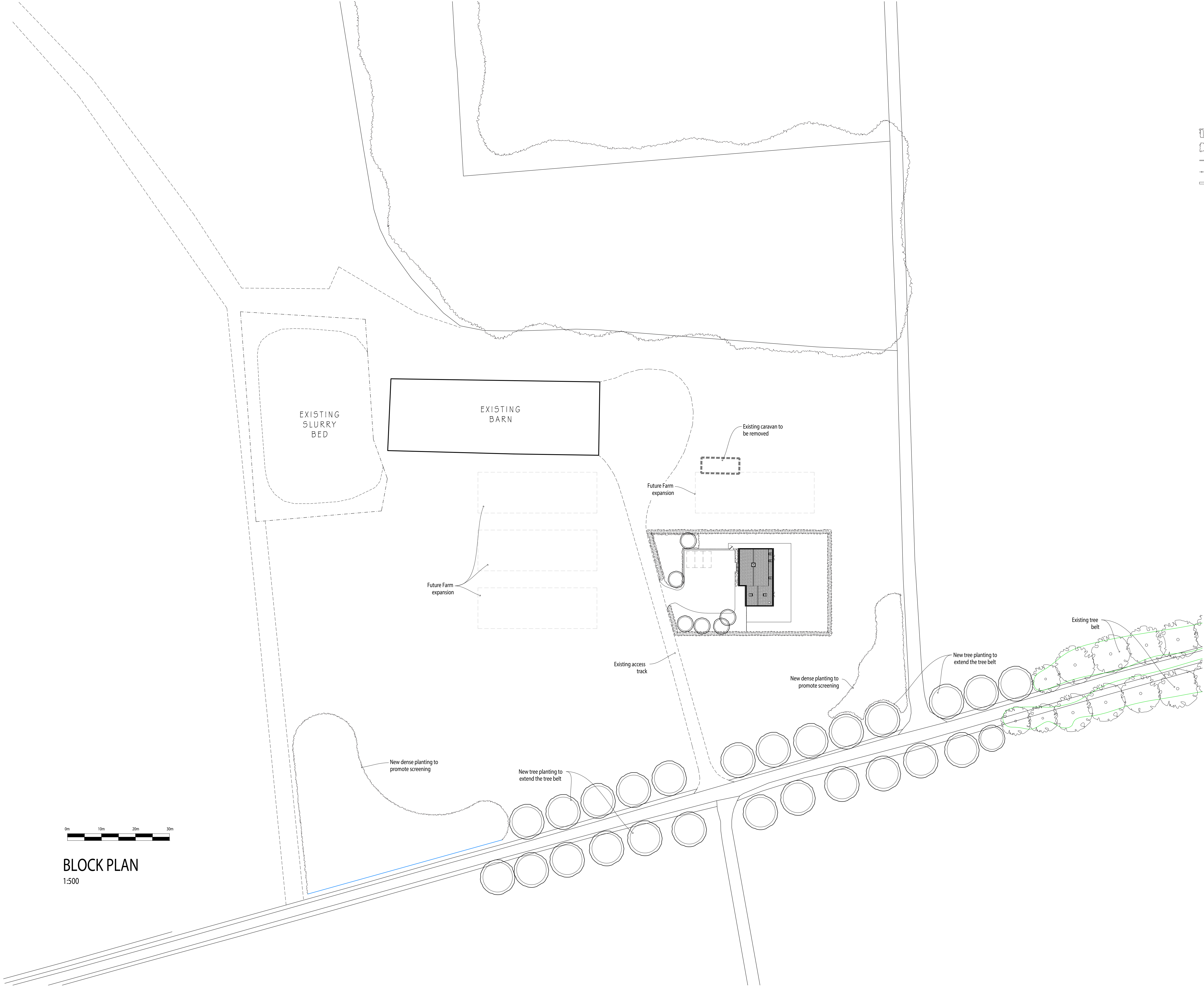
7. Nutrient Assessment

- 7.1 The NE-gen 1 sewage loading, WwTW performance for TN and land use component are included in the calculations contained in Appendix C.
- 7.2 Initial calculations indicate that inclusive of the 20% buffer there **may** be a net phosphorus increase of **+0.48 KgTP/yr** from the proposed development.
- 7.3 **However** the proposed PTP discharge is of small volume (< 2m³/day) and remote from other nearby properties with similar discharges. The site is not in Flood Zones FZ2 or FZ3 and is flat and remote from watercourses or treated effluent sensitive receptors. The discharge location therefore appears to be below threshold criteria set out in **Natural England methodology 16 March 2022- Annex F. Subject to criteria (d) - groundwater level >2mbgl being met this discharge would be below threshold triggers and the discharge would be considered to have an insignificant level of phosphorus by Natural England and deemed to have nil impact.**
- 7.4 The site is located on a hilltop in a region of very thick permeable chalk geology at some 184mAOD, some 50m above the valley floor at 134mAOD. We conclude from this that groundwater level at the site is significantly >2mbgl and criteria (d) is also met. **The discharge will therefore be below threshold triggers and the discharge considered to have an insignificant level of phosphorus by Natural England and deemed to have nil impact.**

8. Mitigation

- 8.1 **The discharge meets the criteria set out in Natural England methodology 22 March 2022 Annex F. No mitigation is required.**

Appendix A



KEY

- Existing tree
- Tree to be removed
- New tree
- New hedge
- Planting bed
- Close boarded fence 1.8m high
- Post and rail fence 1.2m high
- Brick / Block wall

A	-	HB	08.01.25
revisions		initial	date

Contractors, Sub Contractors and Suppliers are to check all relevant dimensions and levels of site and buildings before commencing any shop drawings or building work.

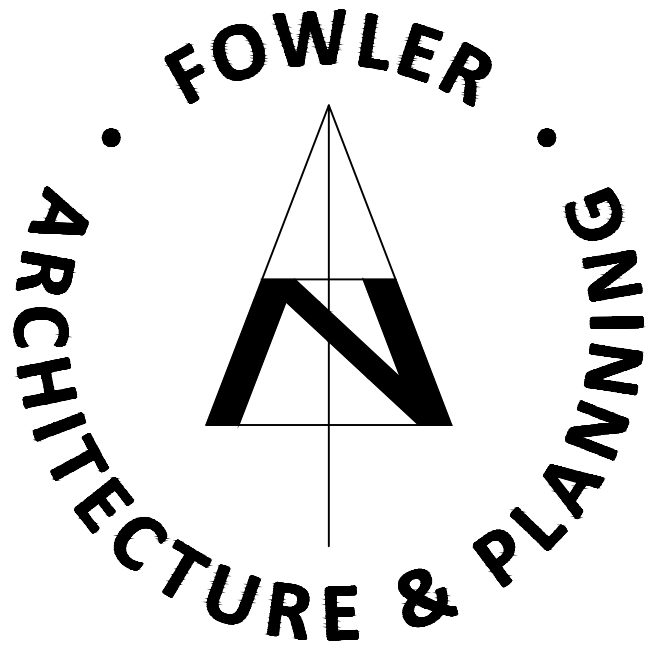
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project
MANOR FARM
Collingbourne Kingston

drawing
Block Plan

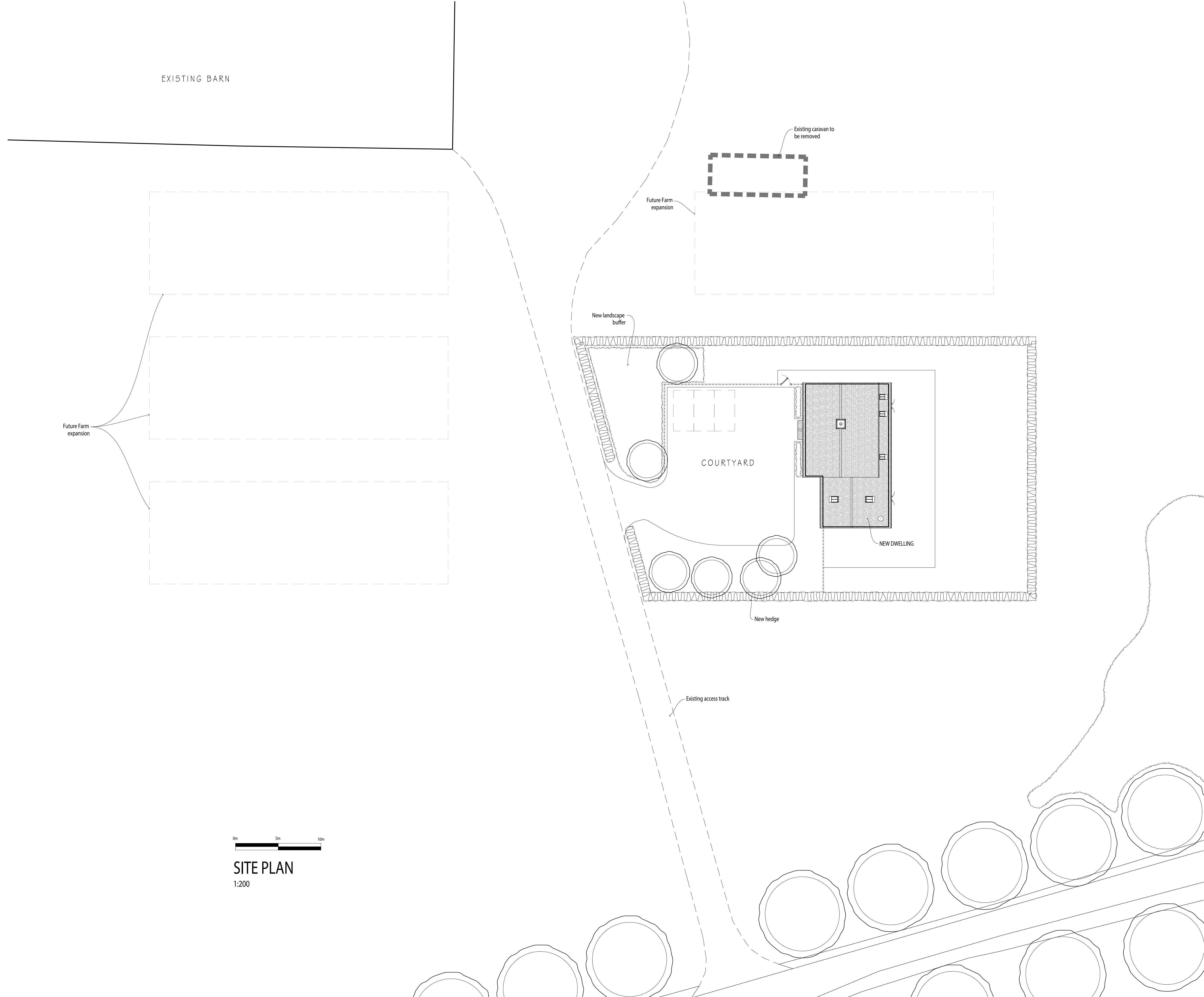
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KEY

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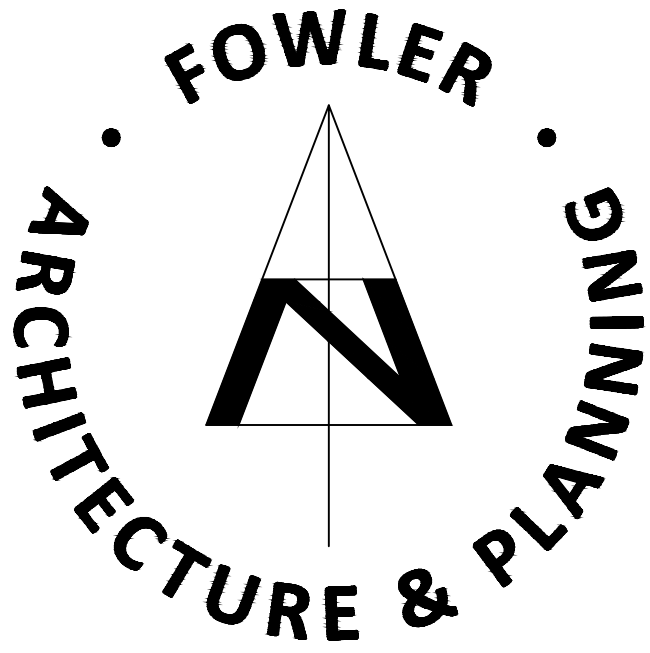
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project
MANOR FARM
Collingbourne Kingston

drawing
Site Plan

scale	drawn by	date
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drawing no	rev



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Appendix B



Prüfinstitut für
Abwassertechnik
GmbH

PERFORMANCE RESULTS

Otto Graf GmbH

Carl-Zeiss-Str. 2 - 6, 79331 Teningen, Germany

EN 12566-3

Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system one2clean

SBR plant in one two-zone polypropylene tank

Test report PIA2014-216B14.01.e

Nominal organic daily load*	0.27	kg/d	
Nominal hydraulic daily load	0.75	m³/d	
Material	polypropylene		
Treatment efficiency (nominal sequences)		Efficiency	Effluent
	COD	94.2 %	43 mg/l
	BOD ₅	98.0 %	7 mg/l
	SS	96.3 %	14 mg/l
	NH ₄ -N**	98.3 %	0.5 mg/l
	N _{tot} **	87.0 %	7.9 mg/l
	P _{tot}	80.2 %	1.6 mg/l
Electrical consumption	0.63	kWh/d	

*at a test influent of ≥ 300 mg/l BOD₅ (mean)

**determined for temperatures $\geq 12^{\circ}\text{C}$ in the bioreactor

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH

(PIA GmbH)

Hergenrath Weg 30

52074 Aachen, Germany

This document replaces neither the declaration
of performance nor the CE marking.



Notified Body
No.: 1739



Certified according to
ISO 9001:2008



Deutsche
Akkreditierungsstelle
D-PL-17712-01-00

Prüfinstitut für Abwassertechnik GmbH

geprüft - tested - testé

Elmar Lancé

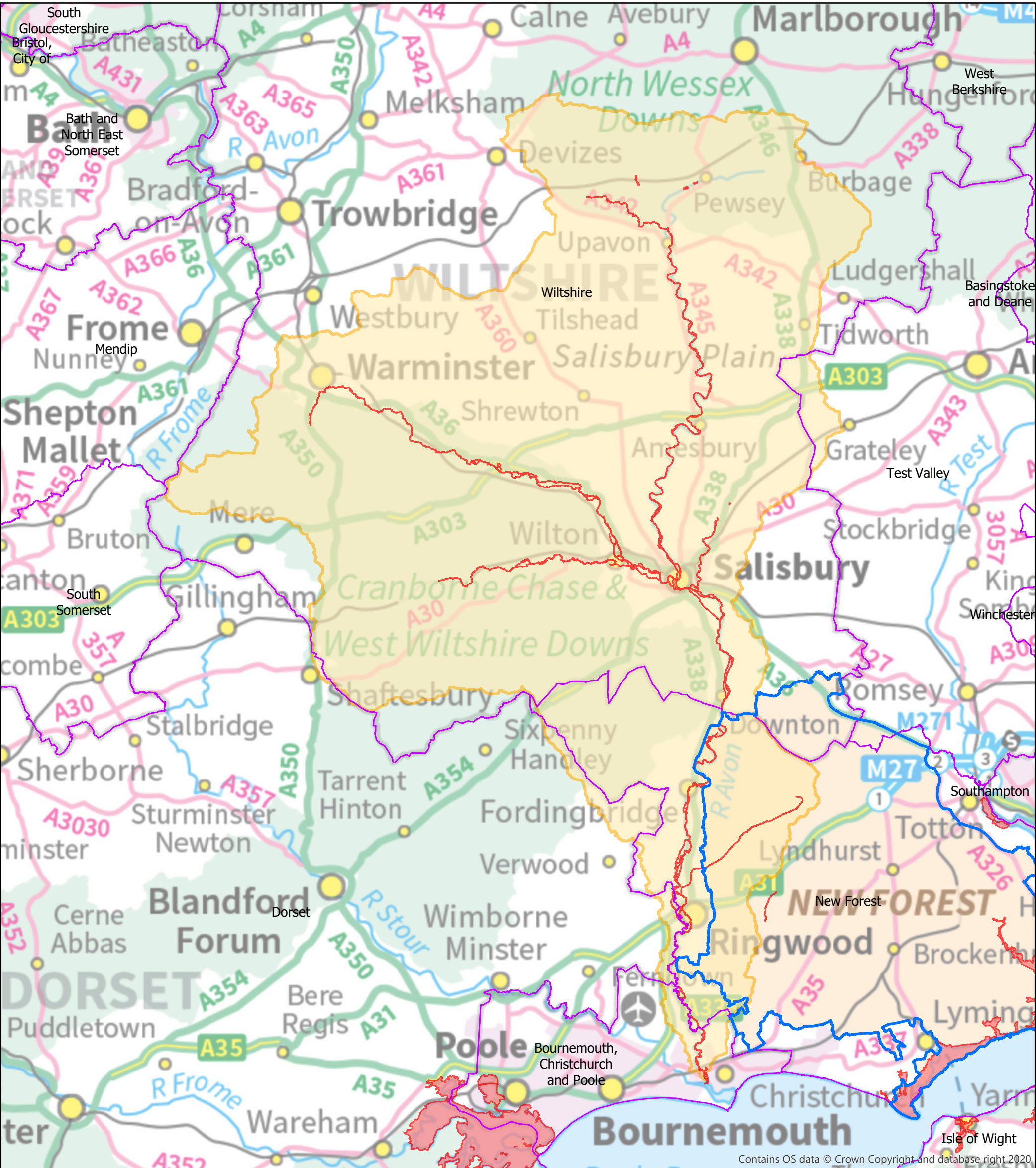
November 2014

Appendix C

Water infrastructure information			
Description of required information	Data entry column - user inputs required	Additional d column - us may be requ	
Date of first occupancy (dd/mm/yyyy):	01/03/2026		
Average occupancy rate (people/dwelling or people/unit):	2.40		
Water usage (litres/person/day):	120		
Development proposal (dwellings/units):	1		
Wastewater treatment works:	Package Treatment Plant user defined		
Current wastewater treatment works P permit (mg TP/litre):	Enter value in cell C10	1.6	
Not applicable	Not applicable		
Not applicable	Not applicable		
Final calculation of nutrient load from wastewater			
Description of values generated	Values generated		
Wastewater nutrient loading			
Additional population (people):	2.40		
Wastewater by development (litres/day):	288.00		
Annual wastewater TP load (kg TP/yr):	0.17		
Not applicable			
Not applicable	Not applicable		
Not applicable			
Not applicable	Not applicable		

Future land uses		
New land use type(s) - user inputs required	Area (ha) - user inputs required	Annual phosphorus export (kg TP/yr)
Residential urban land	0.15	0.25
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
Totals:	0.15	0.25

Total nutrient budget calculations	
Description of values generated	Values generated
Wastewater TP load (kg TP/year):	0.17
Net land use TP change (kg TP/year):	0.23
TP budget:	0.40
TP budget + 20% buffer:	0.48
Annual nutrient budget	
The total annual phosphorus load to mitigate is (kg TP/yr):	0.48
Not applicable	
Not applicable	Not applicable
Not applicable	
Not applicable	Not applicable



European protected sites requiring nutrient neutrality strategic solutions Scale: 1:280,000

Component SSSIs of River Avon SAC

- Local Authorities
- SSSI subject to nutrient neutrality strategy
- Nutrient neutrality SSSI catchment
- National Parks



Appendix D

CONDITIONS AND LIMITATIONS OF NITROGEN NUTRIENT ASSESSMENT

May 2020

Aqua Callidus Consulting Ltd is constituted as a limited liability company in accordance with the Companies Act 1989 (with registered number 11390910 and with its registered office at Kintyre House, 70 High Street, Fareham, Hants, PO16 7BB).



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6. Unless stated otherwise the nitrogen assessment is based on site specific information provided by the client and manufacturers and wastewater companies public information on the performance of wastewater treatment plants and works. No liability is accepted for the accuracy of such third party information.
7. Unless stated otherwise the nitrogen assessment is undertaken as a desktop assessment and no site visit has been made.