TN01 - Water Neutrality Statement

Site: Moatfield Farm,
Prepared by: Phil Allen MCIWEM C.WEM
Approved by: Neil Jaques
Date: 18 March 2024

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1.0 Introduction

1.1 Following the issue of Natural England's (NE's) Position Statement on Water Neutrality within the Sussex North Water Supply Zone (SNWSZ) all new, reserved matters, conditions discharge and Section 73 planning applications within the SNWSZ must demonstrate that the development can be water neutral. The SNWSZ covers part of Horsham District, as well as parts of the neighbouring Chichester, Arun and Crawley Districts. A plan showing the supply area can be found in Appendix A and NE's Position Statement can be found in full within Appendix B.

1.2 This Water Neutrality Statement (WNS) has been prepared to demonstrate how the proposed development at Moatfield Farm, Kings Lane, Cowfold plans to achieve water neutrality. The development proposals are to convert two existing agricultural buildings to form two dwellings.

1.3 A location plan of Moatfield Farm and the proposed development can be seen in Appendix C. The existing layout of the agricultural buildings can be seen in Appendix D and proposed layouts of the dwellings can be seen in Appendix E.

1.4 Because Moatfield Farm is within the SNWSZ, Horsham District Council (HDC) as the Local Planning Authority (LPA) wish to know whether the proposed development represents a change in water consumption and, if so, that the proposed development can be water neutral.

1.5 Therefore, to satisfy NE's and HDC's requirements on water neutrality, this WNS will set out the following:

- The baseline, water demand for the existing agricultural buildings and what forms the basis of that water demand;
- The changes in water demand that will occur because of the proposed conversion of the agricultural buildings to 2no. dwellings.
- Whether water demand reduction measures such as the fitting of water efficient fixtures and fittings will be beneficial;
- Whether any offsetting measures are required, and;
- Whether the proposed development will be water neutral.

2.0 Existing Baseline Water Demand

2.1 The agricultural buildings are currently used by a tenant farmer for the shelter of dairy cattle. There are between 45 – 50 head of cattle, with 24 cattle between 2 and 12 years of age and remaining number being calves. The water use of the agricultural buildings is exclusively for drinking water for the cattle.

2.2 The agricultural buildings are on a separate mains water feed from that of Moatfield Farm, which can be appreciated because of the distance between the farm and the agricultural buildings, as displayed in the location plan in Appendix C.

2.3 Prior to November 2020, the water feed for the agricultural buildings came from and was paid for by a third-party neighbour. In November 2020 the water feed for the agricultural buildings was switched to Park Farm (which is adjacent to the agricultural buildings) and, at the same time, a water meter was installed on the feed to the agricultural buildings so that the water use of this part of Moatfield Farm could be separated from that of Park Farm.

2.4 This metered feed allows a definitive understanding of the current water use of the agricultural buildings and the existing baseline water demand of the site.

2.5 Because the water meter to agricultural buildings was installed in November 2020 and was a new feed, the water meter started at zero.

2.6 The water meter was checked in October 2023 (a full three years since the meter had been installed) and displayed that 666.6 cubic metres of water had been used. An image of the water meter at the time of the reading can be seen in Appendix F.

2.7 Assuming that the water meter was installed on 1st November 2020 and the reading of 666.6m^3 was taken on the 31st October (the fullest period between November 2020 and October 2023), this covers a period of 1,094 days.

2.8 A water use of 666.6m^3 or 666,600 litres over 1,094 days is the equivalent of 609.32 litres/day. This sets the existing baseline water demand of the two agricultural buildings.

3.0 Future Water Demand

3.1 The proposed development is to convert the two existing agricultural buildings into two dwellings. The larger of the two agricultural buildings will be a five-bedroomed dwelling and the smaller of the two agricultural buildings will be a two-bedroomed dwelling.

3.2 In terms of the mains water demand of the two dwellings, they will need to comply with Paragraph 2 of Schedule F1 of Building Regulations 2010, which states that "*the potential consumption of wholesome water by persons occupying a new dwelling must not exceed 125 litres per person per day*".

3.3 The occupancy levels for the proposed development have been drawn from local census data (as recommended by HDC in their water neutrality methodology guidance) and this is summarised in Table 3.1, below.

Table 3.1 – Average district occupancy levels per dwelling size

1-bedroom	2-bedroom	3-bedroom	4-bedroom	5-bedroom
1.32	1.88	2.47	2.86	3.09

3.4 Using the census data, the population of the proposed two-bedroom dwelling will be 1.88 persons and the population of the five-bedroom dwelling will be 3.09 persons. Therefore, the development will have an overall census-derived population of 4.97 people.

3.5 Using the Building Regulations water consumption figure of 125 litres per person per day and population size of 4.97 people, it is estimated that the total water usage per day for the proposed development would be 621.25 litres per day.

3.6 Therefore, before water efficient fixtures and fittings have been considered, the completion of the proposed development would represent a net increase in water demand of 621.25 litres per day on the site. This is not water neutral.

4.0 Water Consumption Reduction Measures

4.1 To minimise the mains water demand of the two proposed dwellings, they will be equipped with water efficient fixtures and fittings to achieve a water consumption of less than 110 litres per person per day of water, which is in accordance with the optional water efficiency target set out in Building Regulations Part G.

4.2 A water calculation in accordance with Buildings Regulations Part G has been carried out and confirms that each dwelling will be able to achieve a reduced mains water consumption of 96.20 litres per person per day, which includes an allowance of 5 litres per person per day for external water usage. A copy of the water-

efficient Part G calculation can be found in Appendix G and is summarised in Table 4.1, below, which also gives the model names/numbers of the fittings that are required to achieve this specific water consumption figure.

Table 4.1 – Water Efficient Part G Calculation

Fixture/Fitting	Capacity/ Flow Rate	Use Factor	Total Water Usage (l/p/day)	Specification
WC (full flush)	4.5	1.46	6.57	*Roca 'The Gap'*
WC (part flush)	3	2.96	8.88	*Roca 'The Gap'*
Taps (Excluding Kitchen)	4	1.58	7.90	*Hansgrohe Rebris S single lever basin mixer 80 CoolStart EcoSmart+*
Shower	8.3	4.37	36.27	*Hansgrohe Raindance Select S Hand shower 120 3jet PowderRain EcoSmart*
Bath	130 litres	0.11	14.30	*N/A*
Kitchen Taps	4.7	0.44	10.36	*Hansgrohe Logis M31 Single lever kitchen mixer 260 EcoSmart, single spray mode*
Washing Machine (l/kg)	5.56	2.1	11.68	*SAMSUNG Series 5 WW90T554DAN (9kg drum, 50 litres/wash)*
Dishwasher (l/place setting)	0.61	3.6	2.20	*SAMSUNG DW60A8060FS (14 place settings, 8.5 litres per wash)*
		Total	100.22	
		Normalisation Factor	0.91	
		Total	91.20	
		External Water Use	5.00	
		Total	96.20	

4.3 Using the water efficient Part G consumption figure of 96.20 litres per person per day and the census-based development population of 4.97, it is estimated that the water usage per day for the proposed development can be reduced to 478.11 litres per day.

4.4 Therefore, the completion of the proposed development represents a net increase in water demand of 478.11 litres. This increase in water demand means that the proposed development is not water neutral and to achieve water neutrality, offsetting is required.

5.0 Offsetting

5.1 The existing mains water consumption of the two agricultural buildings is drinking water for 45 – 50 head of cattle. As discussed in Section 2.0 of this Water Neutrality Statement, this been measured through the water meter that specifically feeds the agricultural barns and over the last three years there has been an average mains water consumption of 609.32 litres per day.

5.2 It is proposed to move the cattle's drinking water supply from mains water to rainwater harvesting, which will be harvested from the roof areas of the agricultural buildings/proposed dwellings.

Rainwater Harvesting

5.3 The roof area of the larger of the two agricultural buildings/proposed dwellings is 518m^2. The roof area of the smaller of the two agricultural buildings/proposed dwellings is 240m^2. This means that the total roof area available for rainwater harvesting is 758m^2.

5.4 The nearest local Met Office climate station to Cowfold is North Heath, which is approximately 9 miles to the west of Cowfold. The annual average rainfall for the period 1991 – 2020 for North Heath is 858.70mm, as shown in the Met Office data in Appendix H.

5.5 Section 6.1.2 of BS EN 16941:1 (2018) provides the calculation to derive the amount of available rainwater volume that can be harvested. This is:

$$Y_R = (A_i \times h_i \times e_i \times n_i)$$

5.6 Where:

Y_R = the rainwater yield per time step, expressed in litres

A_i = the horizontal projection of the collection area in square metres

h_i = the total rainfall for the chosen time step, expressed in millimetres

e_i = the surface yield coefficient (a constant of 0.85)

n_i = the hydraulic treatment coefficient (a constant of 0.90)

5.7 For the 758m^2 of roof areas across the two agricultural buildings/proposed dwellings, the calculation is:

$$Y_R = (758 \times 858.70 \times 0.85 \times 0.90) = 497{,}934.37 \text{ litres per year}$$

5.8 The annual rainfall yield of 497,934.34 litres/per year is equivalent to 1,364.20 litres per day.

5.9 The average harvestable daily rainwater volume of 1,364.20 litres/day is much more the 609.32 litres/day demand of the cattle. Therefore, if this full amount is harvested, it will be able to supply the water demand requirement of the cattle and this amount, which is currently drawn from the mains water supply, can be deemed as being offset and 'returned' to the mains water supply system.

5.10 The harvested rainwater must be stored to be available and in order to provide 35-days of drought protection (equivalent to 9.6% of the annual demand) in accordance with BS EN 16941:1 (2018) and HDC's own drought protection requirements, the rainwater harvesting tank(s) must be sized to account for this. The annual demand of the cattle is 222,401.8 litres (609.32 x 365) and 9.6% of this annual demand is 21,350 litres. For comparison, 9.6% of the annual rainwater harvesting yield is 47,801.70 litres.

5.11 Because the rainwater harvesting tanks must be at least 21,350 litres in capacity, the chosen storage for the rainwater harvesting will be rainwater harvesting tanks manufactured by SDS. The capacity can be provided by either a single tank or multiple tanks of the same capacity. To provide the most practical and specific storage volume, it is proposed to provide 5no. 4,400 litre SDS rainwater harvesting tanks, which will provide a total storage capacity of 22,000 litres, which is in excess of the required storage capacity of 21,350 litres. The dimensions of the proposed 4,400 litre SDS rainwater harvesting tanks can be found in Appendix I and the suggested location for the SDS rainwater harvesting tanks can be seen in Appendix J, which is in non-private open space so they will be easily accessible for maintenance purposes.

5.12 This section has shown that rainwater harvesting is viable and can form part of the water neutrality and offsetting scheme for the proposed development. The roof areas of the proposed dwellings can supply in excess of the drinking water requirement of the cattle and it is possible to store 9.6% of the annual demand, which is less than 9.6% of the annual yield.

6.0 Comparison of Existing and Offset Water Demand

6.1 If the existing water demand of the agricultural buildings is moved from a mains supply to a rainwater harvesting system, this offsets 609.32 litres/day. The water demand of the two proposed dwellings will be 478.11 litres, which means that once the existing water demand is offset, that the site/development will not only be water neutral, but it will reduce overall water demand within the SNWSZ by 131.21 litres/day (609.32 litres/day – 478.11 litres/day).

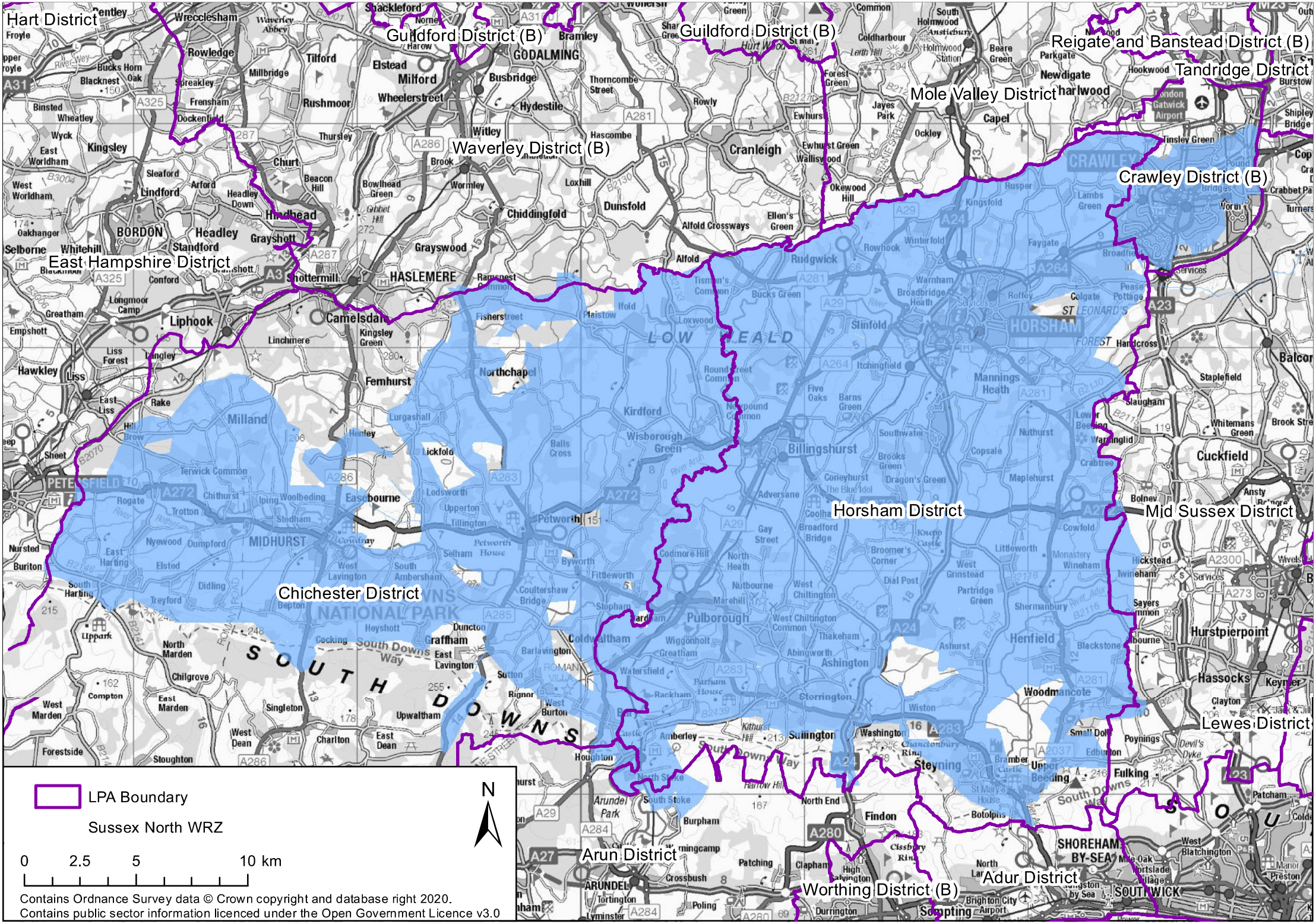
7.0 Summary and Conclusions

7.1 This Water Neutrality Statement has shown that the proposed development at Moatfield Farm can be made water neutral. This will be achieved through switching the mains water demand of the 45 – 50 head of cattle that currently use the agricultural buildings to a rainwater harvested system. This will offset 609.32 litres/day that is currently supplied by mains water within the SNWSZ.

7.2 The mains water demand of the two proposed dwellings has been reduced to 478.11 litres/day once water efficient fixtures and fittings have been specified. This is based on a total census-based population of 4.95 persons. Because the mains water demand of the development (478.11 litres) is less than that of the existing, which will be offset (609.32 litres), the proposed development can be considered as water neutral and, moreover, will represent a mains water saving of 131.21 litres over the existing situation. Therefore, water neutrality should not form an impediment to the progress of this application.

Appendix A

Sussex North Water Supply Zone (SNWSZ)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Guildford District (B)
Reigate and Banstead District (B)
Tandridge District
Mole Valley District
Waverley District (B)
Crawley District (B)
East Hampshire District
Horsham District
Mid Sussex District
Chichester District
Lewes District
Arun District
Adur District
Worthing District (B)
LPA Boundary
Sussex North WRZ
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Appendix B

Natural England Position Statement

Natural England's Position Statement for Applications within the Sussex North Water Supply Zone

September 2021 – Interim Approach

Please take the following as Natural England's substantive advice for all applications which fall within Sussex North's Water Supply Zone.

Sussex North Water Supply Zone

Arun Valley SPA, SAC and Ramsar Site- Sussex North Water Supply Zone

The Sussex North Water Supply Zone includes supplies from a groundwater abstraction which cannot, with certainty, conclude no adverse effect on the integrity of;

- Arun Valley Special Area Conservation (SAC)
- Arun Valley Special Protection Area (SPA)
- Arun Valley Ramsar Site.

As it cannot be concluded that the existing abstraction within Sussex North Water Supply Zone is not having an impact on the Arun Valley site, we advise that developments within this zone must not add to this impact. This is required by recent caselaw, Case C-323/17 People over wind and Sweetman. Ruling of CJEU (often referred to as sweetman II) and Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu Case C-293/17 (often referred to as the Dutch Nitrogen cases).

Between them these cases require Plans and Projects affecting sites where an existing adverse effect is known (i.e. the site is failing its conservation objectives), to demonstrate certainty that they will not contribute further to the existing adverse effect or go through to the latter stages of the Regulations (no alternatives IROPI etc).

Developments within Sussex North must therefore must not add to this impact and one way of achieving this is to demonstrate water neutrality.

In addition, the Gatwick Sub regional Water Cycle Study concluded that water neutrality is required for Sussex North to enable sufficient water to be available to the region.

The definition of water neutrality is the use of water in the supply area before the development is the same or lower after the development is in place.

Strategic approach

Natural England has advised that this matter should be resolved in partnership through Local Plans across the affected authorities, where policy and assessment can be agreed and secured to ensure water use is offset for all new developments within Sussex North. To achieve this Natural England is working in partnership with all the relevant authorities to secure water neutrality collectively through a water neutrality strategy.

Whilst the strategy is evolving, Natural England advises that decisions on planning applications should await its completion. However, if there are applications which a planning authority deems critical to proceed in the absence of the strategy, then Natural England advises that any application needs to demonstrate water neutrality. We have provided the following agreed interim approach for demonstrating water neutrality;

Minimising water use of new builds.

- Complete a water budget (based on occupancy)
- All new builds to demonstrate that they can achieve strict water targets (e.g., 85L/pp/day*)

  This can be achieved by measures such as:

- Grey water recycling (advantage of being reliable in hot dry weather);
- Rainwater harvesting;
- Water efficient fixings (such as shower aerators) to demonstrably reduce demand-this would need to be suitably certain.

In addition, water offsetting is required

- One way to achieve this is retrofitting of council owned properties/commercial buildings-located within Sussex North. Examples include:

- Grey water recycling- (for example there are clear opportunities for commercial properties).
- Rainwater harvesting of commercial settings;
- Installation of water reduction fittings in Council-owned buildings.

These measures need to be implemented until such time as a more sustainable water supply has been secured.

It will also need to be ensured that measures are not already proposed (for example in Southern Water's Management Plan) to avoid double-counting.

Any mitigation must be suitably certain in order to comply with the Habitats Regulations and Caselaw.

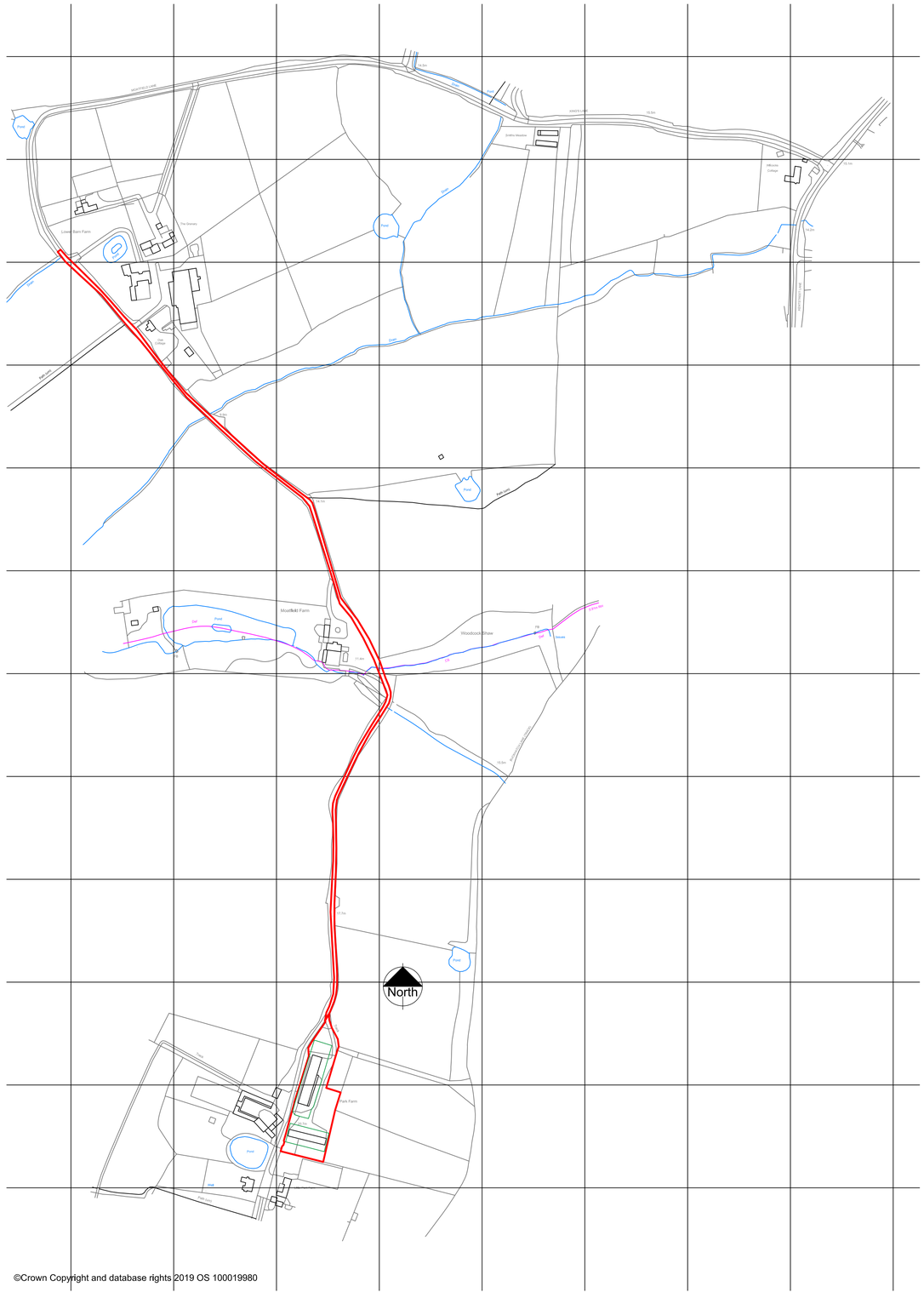
If the application cannot demonstrate, through an appropriate assessment, the required water neutrality, we advise that it is either revised to achieve this in line with the above or awaits completion of the strategic approach.

The securing of water neutrality is a matter which needs to be resolved at a strategic level and Natural England is working with the relevant authorities and the water company to achieve this. In light of this, Natural England will not be engaging with individual planning applications whilst the strategy is evolving.

***This this is the reasonably achievable figure with the above measures based on the early data from the strategic solution and may be subject to change as the strategic solution evolves.**

Appendix C

Site Location Plan



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LOCATION PLAN

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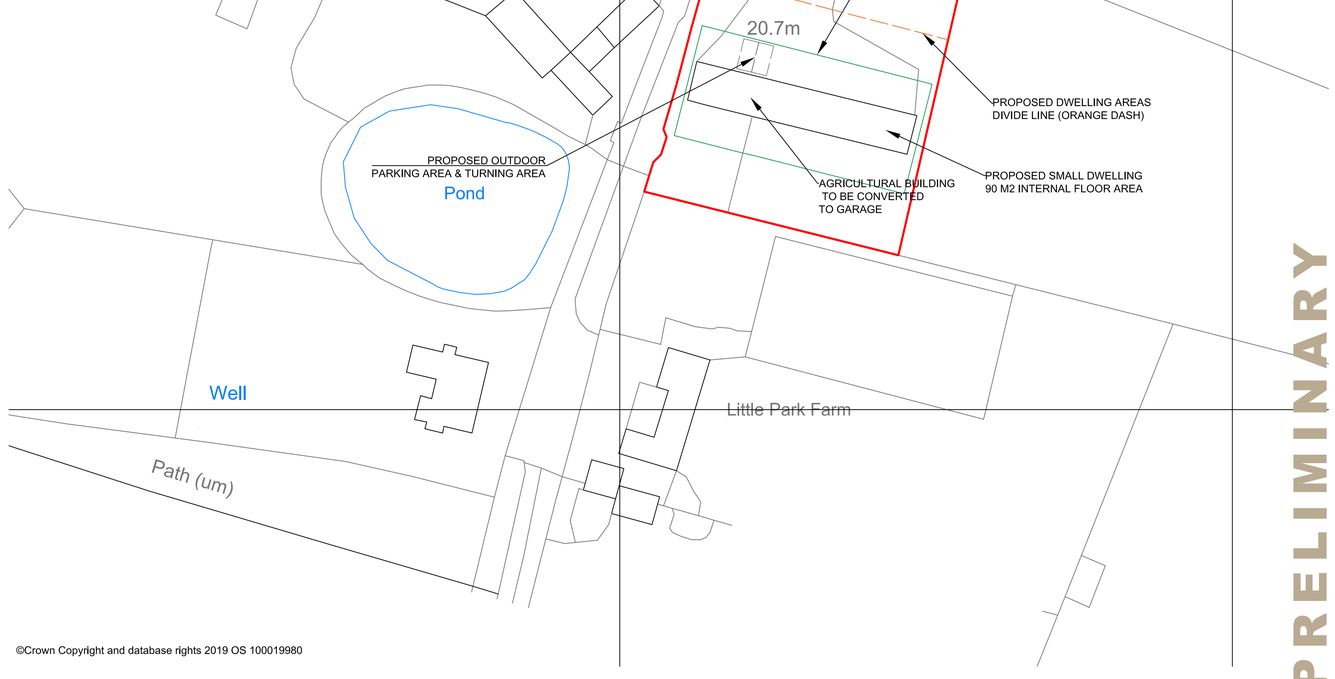

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BLOCK PLAN

Scale 1:500

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SITE LOCATION & BLOCK PLAN
PROPOSED DWELLINGS

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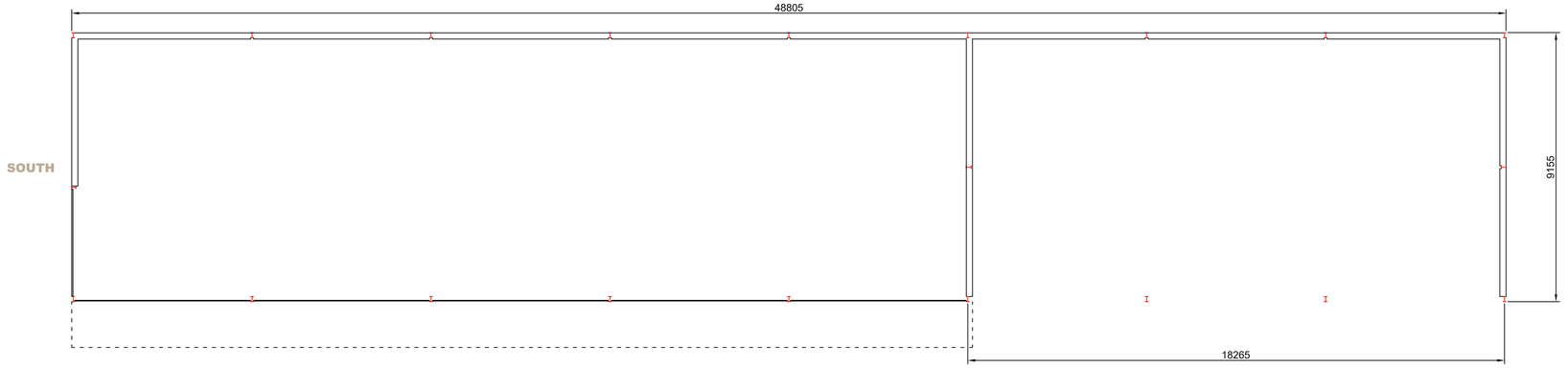
Appendix D

Existing Agricultural Building Layout

WEST



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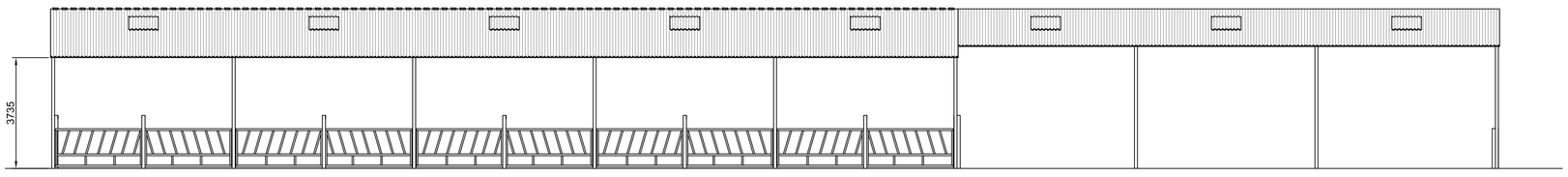

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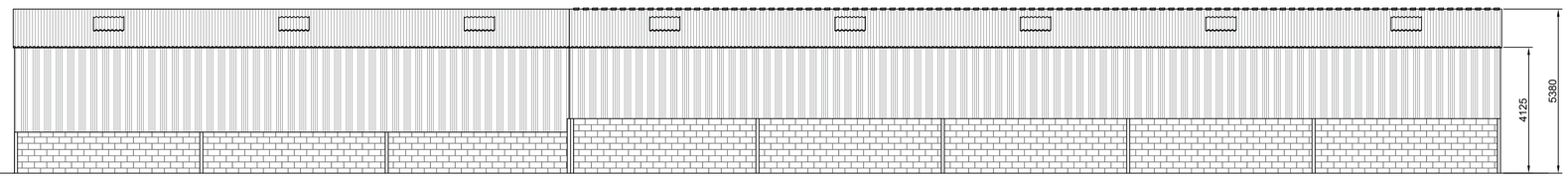

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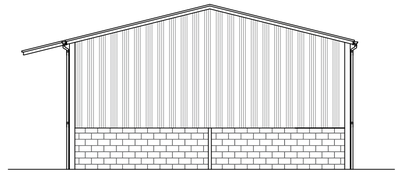

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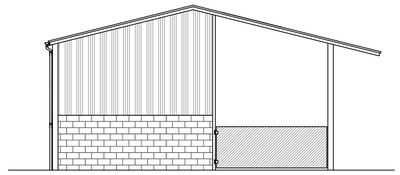

SOUTH

FLOOR PLAN & ELEVATIONS

Scale 1:100

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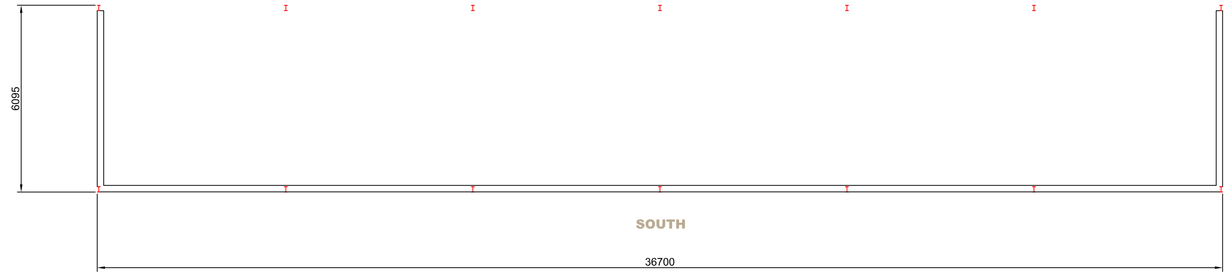

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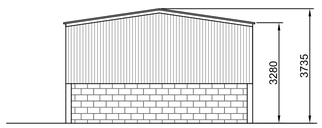

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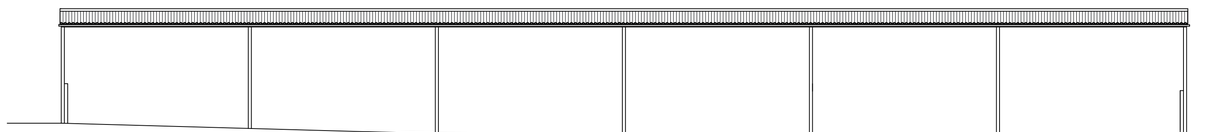

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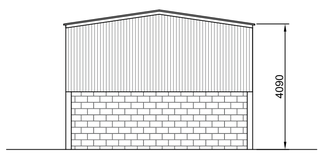

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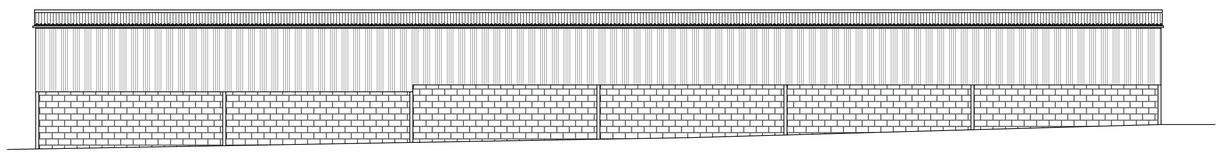

SOUTH

FLOOR PLAN & ELEVATIONS

Scale 1:100

North

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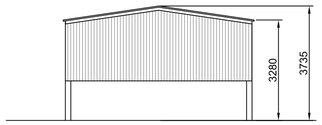
Appendix E

Layout of the Proposed Dwellings



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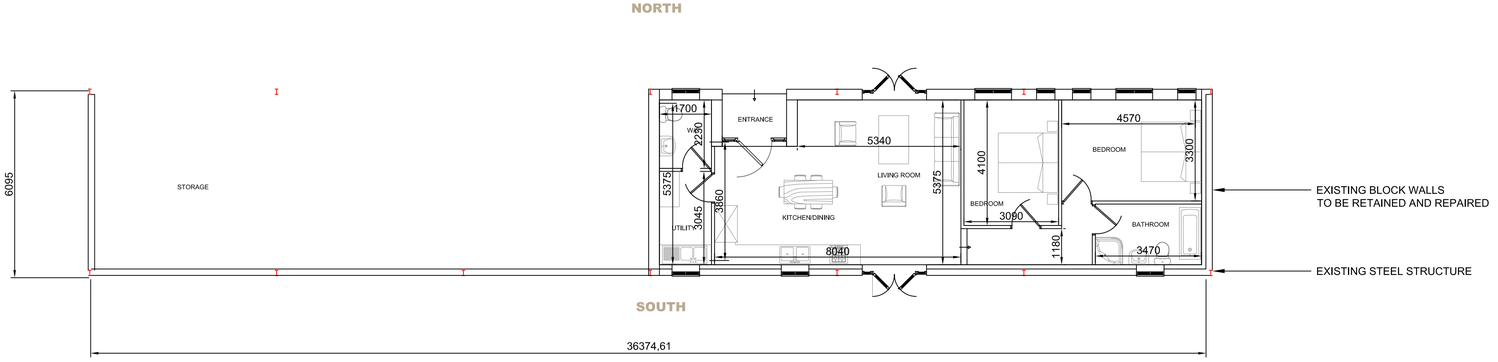

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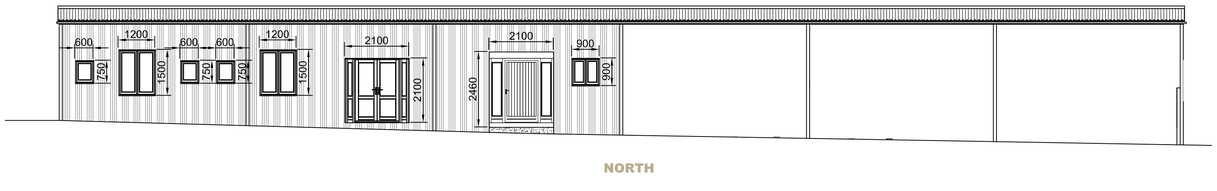

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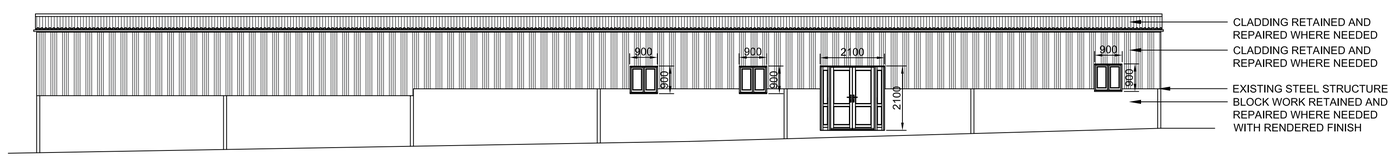

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CMF/HD21/027	100_04	

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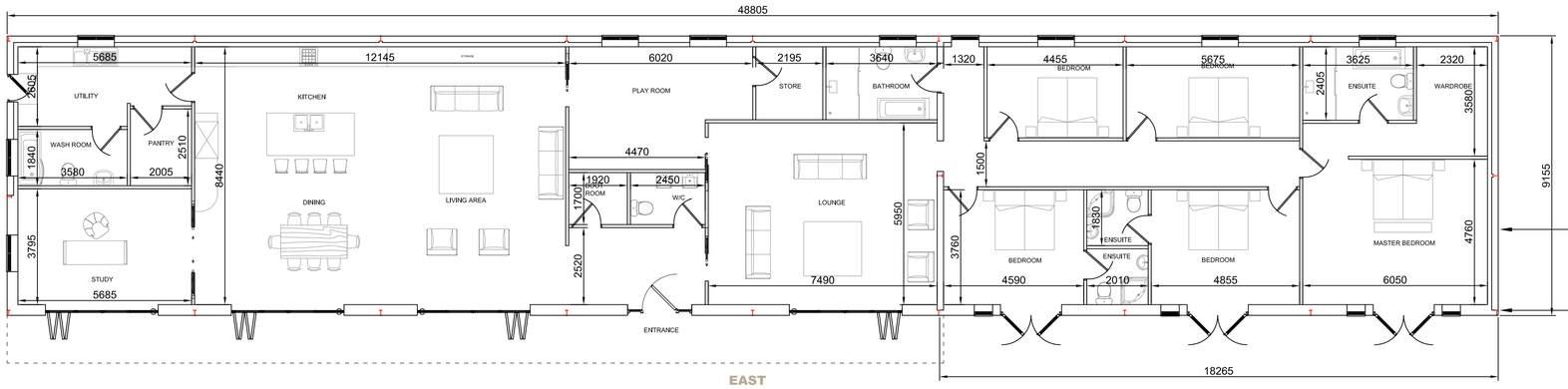
WEST



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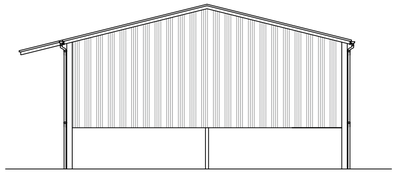

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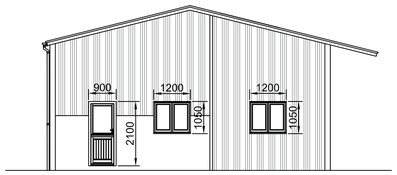

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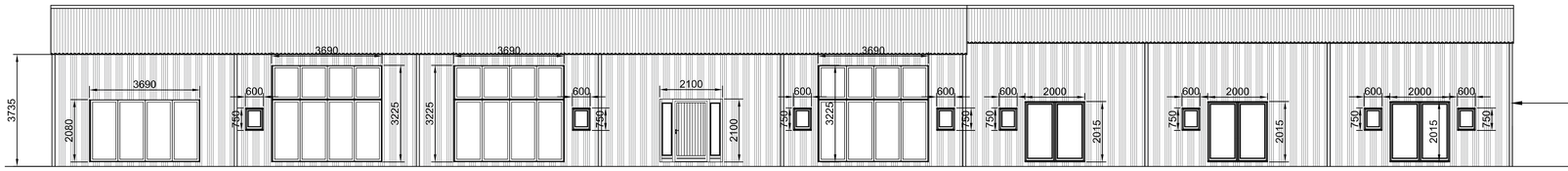

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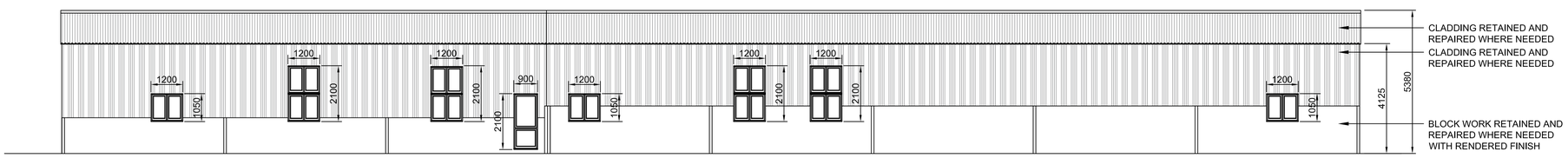

WEST

FLOOR PLAN & ELEVATIONS

Scale 1:100

North

NOTES:
1. Use written dimensions only. All dimensions to be checked on site and any discrepancies reported to ACORUS immediately. If in doubt ask.
2. Where relevant, significant hazards have been identified on the drawing. Hazards which should be obvious to a competent contractor or unforeseeable have not been identified.
3. This drawing is confidential and remains the exclusive property of ACORUS.
4. Ordnance Survey Paper Map Copying Licence Number: 100039456.

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RICS Regulated by RICS

1:100

0 5 m 10 m 15 m 20 m

CONVERSION TO DWELLING
INTERNAL FLOOR AREA - 405 M2

PRELIMINARY

PROJECT
CHAPMAN
MOATFIELD FARM BARNS
RH13 8BD

TITLE
PROPOSED DRAWINGS BUILDING 1
PLAN & ELEVATIONS

SCALE	DATE	DRAWN BY	CHECKED BY
AS SHOWN @A1	02/21	EB	HD

JOB NO.	DRAWING NO.	REVISION
CMF/HD21/027	100_03	

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Appendix F

Agricultural Building Water Meter Reading (October 2023)


m³
M18
0126
ARAD
x 0.0001
x 0.001
x 0.01
P - 15 mm
Q3 1.6, R315
MAP 16 bar
ΔP 16, T50

Appendix G

Water Efficient Part G Calculation

Proposed Water Usage

Fixture	Capacity/Flow Rate	Use Factor	Fixed Use	litres/person/ day
WC (Single Flush)		4.42		
WC (Dual Flush)	4.5	1.46		6.57
WC (Dual Flush) Part	3	2.96		8.88
Taps (excluding kitchen)	4	1.58	1.58	7.90
Bath (where shower present)	130	0.11		14.30
Shower (where bath present)	8.3	4.37		36.27
Bath Only		0.5		
Shower Only		5.6		
Kitchen Sink	4.7	0.44	10.36	12.43
Washing Machine (l/kg)	5.56	2.1		11.68
Dishwasher (l/place setting)	0.61	3.6		2.20
	Total calculated use (litres/person/day)			100.22
Normalisation Factor				0.91
Total Water Consumption (CSH) (litres/person/day)				91.20
External Water Use				5.00
Total Water Consumption (Part G) (litres/person/day)				96.20

Appendix H

North Heath Climate Station Rainfall Data

Average tables | Average graphs | Location comparison | Average maps

Climate period: 1991-2020

Station: North Heath

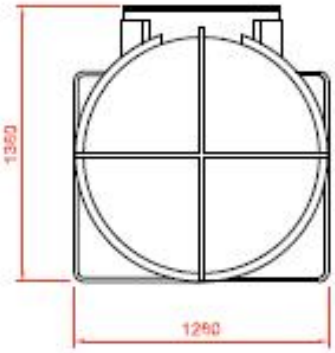
Month	Maximum temperature (°C)	Minimum temperature (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)	Monthly mean wind speed at 10 m (knots)
January	8.55	2.52	–	55.25	92.33	–	–
February	9.02	2.24	–	83.04	63.49	–	–
March	11.74	3.44	–	117.86	52.58	–	–
April	14.83	4.64	–	170.19	52.57	–	–
May	17.61	6.99	–	205.07	46.86	–	–
June	20.65	9.68	–	199.60	55.92	–	–
July	23.31	11.77	–	215.93	63.28	–	–
August	22.99	11.58	–	196.60	63.61	–	–
September	19.93	9.46	–	148.17	63.38	–	–
October	15.89	7.06	–	109.26	103.33	–	–
November	11.89	4.40	–	66.22	103.13	–	–
December	9.20	2.62	–	54.06	98.22	–	–
Annual	15.50	6.39	–	1621.25	858.70	–	–

Appendix I

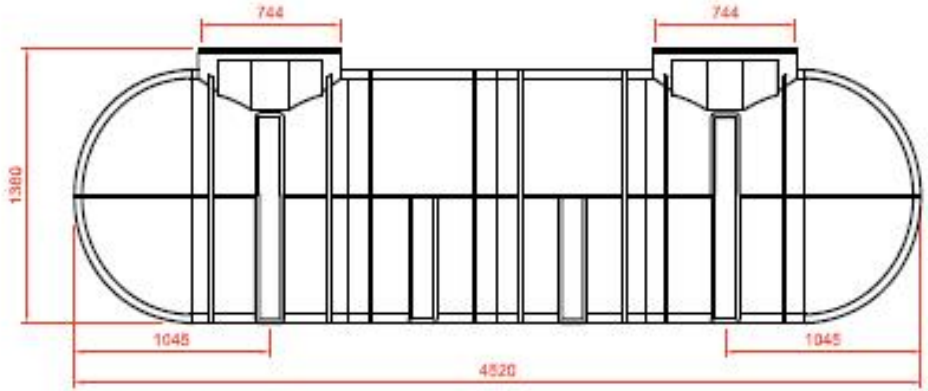
SDS Rainwater Harvesting Tank Details

SDS 4,400 Litre Rainwater Harvesting Tank

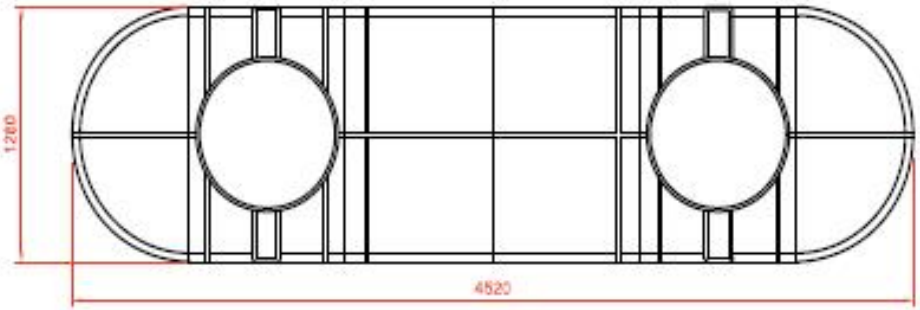




END ELEVATION



SIDE ELEVATION



PLAN

Client	SDS	Details
Project Name	4,400 Litre Tank	
Type	Standard Detail	
Date	-	
Drawing no.	-	
Revision	A	

Notes:

This Drawing is to be read in conjunction with all relevant Architect, Engineers and Specialists drawings and specifications.

Do not scale from the drawing in either paper or digital form. Use written dimensions only.

SDS Water Infrastructure Systems

Appendix J

Suggested Rainwater Harvesting Tank Location



Block Plan - Existing

Site boundary

Land owned by the applicant

0 5 25 50m

N

NOTES

All dimensions are from structure to structure unless indicated otherwise.

Elements of structure and services are indicated for coordination purposes. For full structural and services layouts refer to Structural and Services Engineers' drawings

Do not scale directly from drawing. All dimension to be checked on site prior to construction or fabrication of any elements.

Any discrepancies between figured dimensions to be reported to architect for clarification prior to commencing work.

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Rev	Date Comments

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Job No:	268
Project:	Moatfield Farm Barns
Drawing title:	Block Plan Existing
Scale:	1:500 @ A1 / 1:1000 @ A3
Origination Date:	January, 2022
Status:	Planning
Drawing No :	**268/PL/050**
Rev	-