

The
FARM CONSULTANCY
Group



AgriAngels
ANGYLION AMAETH

Efail Fach, Llanddarog Road,
Capel Dewi, Carmarthen. SA32 8AJ

Tel: (01267) 275 778

Fax: (01267) 275 502

Farm Waste Management Plan

**Drefach Farms Ltd
Drefach
Henllan Amgoed
Whitland
Carmarthenshire
SA34 0SP**

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Farm Waste Management Plan

Introduction

The Farm Waste Management Plan is based on the following three sections:






1. Land available - help you decide when and where to spread slurry, manure, dirty water, silage effluent and other organic wastes to minimise the risk of pollution;
2. Storage - work out the amount and type of storage you need on the farm to avoid the risk of pollution. Decide whether the 4 months' storage capacity specified in the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 (as amended) is needed, and sufficient.
3. Disposal & Spreading - help you decide when to spread and how to make allowances for organic manures when spreading artificial fertilisers.

The Farm Waste Management Plan has been prepared from physical information supplied by the Directors of Drefach Farms Ltd. The report is prepared in good faith and every effort has been made to ensure accuracy, however all responsibility for actions taken lies with the farmer.

Land area available for spreading

The first stage in planning is to pick out any land where waste should not be spread at any time. An untreated strip of at least 10 metres wide should be allowed on both sides of watercourses. Do not forget those on the boundary of your farm. A buffer strip may help reduce the risk of causing pollution. Irrigation systems should work so that there is no chance of their spray coming within 10 metres of a watercourse or of wind blowing material into a watercourse. To reduce the risk of polluting groundwater, livestock manures and other organic wastes should not be applied within 50 metres of a spring, well or borehole that supplies water for human consumption, or is to be used in farm dairies. In some cases, a bigger distance will be needed, particularly up-slope of a spring or shallow well. Bear in mind any water sources on your neighbour's land.

Appendix 1 highlights the suitability of land for spreading of slurry. All maps are colour coded as follows:

-  No Spread Areas.
-  High Risk Areas - Avoid orange areas in winter and in a dry summer when the soil cracks down to the drains, or when the soil is compacted.
-  Medium Risk Areas - You can use yellow areas throughout the year subject to ground conditions, but restrict application rates in the winter.
-  Low Risk Areas - Green areas can be used throughout the year.
-  White - Areas which are not used for spreading i.e. yards, off-lying land etc.

The areas highlighted as red are within 10 m of a watercourse, slurry should not be spread in these areas at any time of the year. The farm has 7.47 Ha of land that falls into this category.

The areas highlighted as orange and yellow are areas where there is a possible risk of run-off. These are areas where at certain times of the year the following conditions apply:

- fields likely to flood sometime in most winters;
- fields next to a watercourse, where the surface is severely compacted;
- fields next to watercourses, which are waterlogged;
- fields next to a watercourse, that have a steep slope and the soil is at field capacity;
- fields next to a watercourse, that have a moderate slope, a slowly permeable soil and the soil is at field capacity.

The farm has 1.27 Ha of land that can be described as orange or yellow.

The areas highlighted as white are areas which are not currently used to spread manures. The holding has 9.01 Ha of land which falls into this category.

This leaves 144.08 Ha of Green land that is suitable for spreading throughout the year.

This is demonstrated in **Table 1** overleaf.

Table 1: Total land area available for spreading organic manure and slurry.

Field Number		Field Size (Ha)	Red Areas (Ha)	White Areas (Ha)	Orange & Yellow (Ha)	Green Areas (Ha)
SN1620	3860	1.62	0.00	0.00	0.00	1.62
SN1620	4369	1.70	0.00	0.00	0.00	1.70
SN1620	4756	1.58	0.00	0.00	0.00	1.58
SN1620	5344	0.00	0.00	0.00	0.00	0.00
SN1620	5731	1.80	0.41	0.00	0.00	1.39
SN1620	5865	0.85	0.00	0.00	0.00	0.85
SN1620	9185	3.31	0.00	0.00	0.00	3.31
SN1621	2630	1.58	0.00	0.00	0.00	1.58
SN1621	2919	1.14	0.00	0.00	0.00	1.14
SN1621	3542	1.56	0.00	0.00	0.00	1.56
SN1621	4011	3.17	0.00	0.00	0.00	3.17
SN1621	4227	0.37	0.00	0.00	0.00	0.37
SN1621	4338	1.60	0.00	0.00	0.00	1.60
SN1621	5815	1.92	0.00	0.00	0.00	1.92
SN1621	5826	3.07	0.00	0.00	0.00	3.07
SN1718	9173	5.88	0.32	0.26	0.00	5.30
SN1718	9890	1.90	0.00	0.00	0.00	1.90
SN1719	8803	5.27	0.00	0.05	0.00	5.22
SN1818	4366	0.35	0.00	0.35	0.00	0.00
SN1818	4684	5.40	0.00	0.00	0.00	5.40
SN1818	5985	1.53	0.00	0.00	0.00	1.53
SN1818	6574	2.17	0.00	0.00	0.00	2.17
SN1818	7992	3.43	0.20	0.00	0.00	3.23
SN1818	9894	3.01	0.00	0.00	0.00	3.01
SN1819	3838	2.50	0.00	0.00	0.00	2.50
SN1819	4307	2.48	0.00	0.48	0.00	2.00
SN1819	4323	3.70	0.14	0.10	0.00	3.46
SN1819	4571	5.76	0.00	0.00	0.00	5.76
SN1819	5043	2.40	0.00	0.00	0.00	2.40
SN1819	5408	0.06	0.00	0.06	0.00	0.00
SN1819	5788	2.45	0.01	0.22	0.00	2.22
SN1819	6264	2.13	0.00	2.13	0.00	0.00
SN1819	6401	2.75	0.00	0.00	0.00	2.75
SN1819	6476	1.53	0.00	0.00	0.00	1.53
SN1819	6754	4.04	0.00	0.00	0.00	4.04
SN1819	7416	1.91	0.00	0.00	0.00	1.91
SN1819	7846	2.55	0.00	0.00	0.00	2.55
SN1819	8105	2.33	0.00	0.00	0.00	2.33
SN1819	8163	3.71	1.98	0.00	0.00	1.73
SN1819	8169	0.49	0.00	0.49	0.00	0.00
SN1819	8575	1.80	0.15	0.00	0.00	1.65
SN1819	8624	2.49	0.00	0.00	0.00	2.49
SN1819	9141	2.41	0.00	0.00	0.00	2.41
SN1819	9488	2.82	0.00	0.00	0.00	2.82
SN1819	9614	2.22	0.00	0.00	0.00	2.22
SN1819	9630	0.92	0.00	0.92	0.00	0.00
SN1819	9967	3.43	0.80	0.00	0.00	2.63
SN1919	0490	2.67	0.00	0.00	0.00	2.67
SN1919	0543	1.82	1.82	0.00	0.00	0.00
SN1919	1299	0.93	0.00	0.93	0.00	0.00
SN1618	1765	0.38	0.00	0.38	0.00	0.00
SN1618	2879	0.20	0.00	0.20	0.00	0.00
SN1618	2966	4.75	0.83	0.00	0.65	3.27
SN1618	2999	3.07	0.33	0.00	0.62	2.12
SN1618	3172	0.28	0.28	0.00	0.00	0.00
SN1618	3470	0.37	0.00	0.37	0.00	0.00
SN1618	4083	5.15	0.00	0.45	0.00	4.70
SN1618	4357	0.51	0.00	0.00	0.00	0.51
SN1618	5198	2.27	0.00	0.00	0.00	2.27
SN1618	5462	3.15	0.00	0.00	0.00	3.15
SN1618	5982	4.37	0.00	0.17	0.00	4.20
SN1618	6048	4.41	0.00	0.00	0.00	4.41
SN1618	6799	0.05	0.00	0.05	0.00	0.00
SN1619	5411	0.13	0.00	0.13	0.00	0.00
SN1619	5813	0.06	0.00	0.06	0.00	0.00
SN1619	5909	0.51	0.00	0.51	0.00	0.00
SN1619	6403	0.68	0.20	0.00	0.00	0.48
SN1619	7333	0.70	0.00	0.70	0.00	0.00
SN1619	7418	4.84	0.00	0.00	0.00	4.84
SN1619	8533	2.64	0.00	0.00	0.00	2.64
SN1619	9543	2.68	0.00	0.00	0.00	2.68
SN1719	0256	4.12	0.00	0.00	0.00	4.12
Total		161.83	7.47	9.01	1.27	144.08

Land required.

Matching land area to nutrient in waste

As a general guide, there should be enough land where waste can be spread to make sure that the amount of 'total nitrogen' in livestock wastes and other organic wastes that are applied is less than 250 Kg/Ha/year (kilograms for each hectare each year). This figure does not include manure deposited while livestock is grazing.

Table 2 below shows the total amount of N produced on the farm.

Table 2

Stock Type	No	Total N excreted (Kgs/Hd/Yr)	Total N excreted by Stock (Kgs)
Dairy Cows (700kgs)	250	95	23750
Youngstock 24mths +	60	58	3480
Youngstock 12-24mths	136	47	6392
Youngstock 6-12mths	60	18	1080
Calves 0-6mths	30	7	210
Breeding Ewes	50	7	350
Total N Produced			35,262

Of this N, approximately 40% would be as livestock waste (FYM or slurry) assuming a 5-month housed period. Based on the 'maximum loading' of 250 Kgs N/Ha/annum, the minimum amount of land required for **spreading** is 58.77 Ha.

Table 1 highlighted the land available for spreading. As can be seen the business has 144.08 Ha available for spreading, this is well in excess of the 58.77 Ha required.

If the maximum loading of 250Kg N/Ha/annum were taken into consideration for manure deposited by grazing livestock as well as slurry applications, the minimum area of land required would be as follows:

Total N Produced ÷ Maximum loading of N = Total land area required for grazing & spreading.

$$35,262 \div 250 = 141.08 \text{ Ha}$$

The minimum area required for grazing & spreading is **141.08 Ha**.

The farmed area *not-including short-term lets* is **161.83 Ha**. This exceeds the area required.

The current N loading at Drefach is 217.89 Kgs N/Ha/annum.

Storage.

The manures produced during the housed period is summarised in Table 3 overleaf.

Table 3

Table 3: Slurry Production (1st Oct to 1st March - 152 days)					
		Stock No	Days Housed	Volume/day	Total volume in storage period
Cattle					
Calf	0-6 Mths	30	0	7.0	0
Dairy replacement	>6 & <13 Mths	60	120	20.0	144000
Dairy Cow after 1st calf	>13 Mths	196	150	40.0	1176000
Dairy Cow after 1st calf	8000- 9000 Litres	250	150	53.0	1987500
Sheep					
From 6m up to 9m		15	0	1.8	0.0
After lambing or tupping	> 60 kg	50	0	5.0	0.0
Total Volume slurry in storage period		Box E		Litres	3307500
		Box F		Cubic metres	3307.5
Volume of rainfall entering slurry store in Storage Period					
	Description	Length	Width	Area m ²	
Yard 1	Concrete Yard	12	4	48.0	
Yard 2	Track	3	12	36.0	
Yard 3	Handling Pens	8	6.5	52.0	
Earth Banked Lagoon	Lagoon	42	48	2016.0	
Total area of water entering slurry store					2164.6
Average rainfall in storage period (Oct to Feb inclusive) (mm)					1286
Rainfall data source:		Welsh Government / Environment Agency			
Total Volume of Rainfall entering slurry store (m³)				Box G	2783.6
Dairy Wash water entering slurry store during storage period					
	No Cows	Litres	No Days	Total litres	Volume m ³
Low volume hose	250	12	152	456000	
Or daily measured volume			152	0	
Total volume of wash water entering slurry store (M³)				Box K	456.0
Other foul run-off entering slurry store during storage period					
Details	Machinery / Trailer washing				
Estimate volume 1				50	
Total estimated volume (m³)				Box L	50.0
Total Volume of Cattle & Sheep Slurry, Rainfall & Foul run-off produced in Storage Period (m³)				Box M	6597.1
Total volume bought forward (Box M)					6597.1
Total volume requiring storage (m³)					6597.13
per day (m ³)					43.40
Volume of available slurry storage					
	Length (m)	Width (m)	Depth (m)	Total Capacity (m ³)	Capacity minus freeboard (m ³)
Earth Bank Lined Lagoon	0	0	0	9092.0	7871.6
Slatted Floor Lagoon	45	25	3	3375.0	3182.3
Total available slurry storage (m³)				Box O	11053.9
Shortfall or Excess capacity (m³)					4456.7
					67.6%
Days Storage					254.7

FYM is currently stored on concrete pads. The farm has sufficient suitable land area for spreading during throughout the year. Current legislation allows FYM can either be spread directly to the fields or left to decompose further in field heaps. Field heaps should only be used where there is no risk of run off polluting water. Heaps should not be placed over field drains, within 10 metres of a watercourse or 50 metres of a spring or borehole.

Although the risk of polluting by spreading solid manures is low, surface run off can occur in periods of heavy rainfall after spreading. It is therefore advised that solid manures are spread on the areas highlighted as green or the yellow areas if conditions allow. All dirty water is diverted to the slurry lagoon.

Waste disposal & spreading.

FYM will be spread before housing in the autumn and intermittently through the winter, spring and summer. The land receiving manures is all down to grassland, the land can be classed as a good grass growth class, this is based on the soils being predominantly medium & deep clay soils receiving over 400mm of rainfall during the summer. Assuming the fields are down to productive ryegrasses these fields can receive approximately 300 Kgs N/Ha/annum. This would be achieved through organic N from organic and artificial fertilisers. Allowances should be made for organic manure when applying artificial fertilisers. Table 4 below gives a guide to the nutritive content of FYM.

Table 4

<i>Percentage of total nitrogen available to next crop following slurry and dirty water applications</i>						
	Autumn ^a		Winter ^a		Spring ^a	Summer ^a
	(Aug - Oct, 350mm rainfall to end March)		(Nov - Jan, 200mm rainfall to end March)		(Feb - Apr)	Use on grassland
Surface applied slurry	Sandy/ Shallow	Medium/ Heavy	Sandy/ Shallow	Medium/ Heavy	All soils	All soils
- 2% DM	5	20	25	40	50	35
- 6% DM	5	15	20	30	35	20
- 10% DM	5	10	10	15	20	10
Dirty Water	0	40	10	60	80	50

a) The N availability estimates assume 350mm of rainfall (after autumn application) and 200mm (after winter application) up to the end of soil drainage (usually end March).

To make the best use of the available N, winter and spring spreading is advised to ensure that the crop is applied N at maximum uptake. This is when the N would be most utilised by the next crop i.e. grass. When spreading slurry, you should not apply more than 50 m³/Ha (4500 gallons/acre) of slurry or 50 tonnes/Ha (20 tons/acre) of manure to high-risk land at one time. You can reduce the risk of run-off by applying less than these amounts per application. Leave at least 3 weeks between each application to reduce the surface sealing and to let the soil recover.

Appendices

TYPE OF LIVESTOCK OCCUPANCY LAND AREA REQUIRED AT 250 KG/HA 'TOTAL NITROGEN' APPLICATION RATE

1 dairy cow (550 kg) 6 month housed	0.19 Ha
1 beef cow (500 kg) 6 month housed	0.12 Ha
1 youngstock (400 kg) 6 month housed	0.09 Ha
1 youngstock (180 kg) 6 month housed	0.05 Ha
1 calf (0-6 months) 6 month housed	0.03 Ha

AMOUNT OF EXCRETA PRODUCED BY LIVESTOCK

Type of Livestock	Body weight (kg)	Moisture content	volume % (litres/day)
1 dairy cow	450-650	90	53.0
1 beef/dry cow	500	90	32.0
1 youngstock	400	90	26.0
1 youngstock	180	90	13.0