



**Catchment
Sensitive
Farming**

Working together for
a healthy environment

Slurry/Manure/Silage Handling and Storage (including Financial Implications) Report

Farmer name:	William Westacott
Farm name and address:	Turvins Farm, Chevening, Sevenoaks, Kent, TN14 6HB (visit and report for Home Farm, Chevening)
Farm CPH number:	20/287/0007
Adviser:	John Gadsby & Cheryl Williams
Catchment Adviser:	Daniel Creech
Catchment Adviser Telephone number:	07775 555943
Visit Date:	SE/005/JG/13243 31st August 2022
Date of report:	6th October 2022

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1. Recommendations

Recommendation 1 – investigate all building and yard drainage and ensure diversion of clean water away from slurry stores

Due to historic drainage design issues, the exact path of all roof water is unknown but your suspicion is that around 40% is entering the slurry stores. Fully investigating the drainage paths and diverting clean roof water accordingly will help to reduce pressure on storage and reduce annual spreading costs. To achieve this you should improve surface water management and drainage as per priorities 1, 2 and 3.

Recommendation 2 – upgrade the low dry matter slurry store to ensure compliance

The store does not currently have sufficient storage capacity under SSAFO regulations. There is potential to remove the capacity issue by reducing the volume of clean water to be stored, but there are still concerns regarding the construction of the store which need to be addressed as per priority 3 in order to ensure full compliance.

Recommendation 3 – upgrade the high dry matter slurry store to ensure compliance

The damage to the existing strainer box and volume of material to be stored mean the existing store isn't currently compliant. Replace the strainer box and upgrade the construction as per priorities 4 and 5 to ensure compliance.

Recommendation 4 – clear out the collection channels around your silage pits

During the visit it was noted that the collection channels around your silage pits needed clearing of debris. Ensure this is completed to maintain the compliance of the pits.

Recommendation 5 – ensure there is suitable storage for Horse FYM

Collecting the Horse FYM in the yard beyond the livery shed means all runoff is considered slurry and therefore must be treated as such. Providing a dedicated store would prevent the water on this yard having to be diverted to the slurry storage.

Recommendation 6 – Water Holding Structures Design Visit

The recommendations include diversion of yard drainage and clean water. The proposals allow for this, but a water holding structures design visit would be recommended to review the need for sediment ponds and the appropriate design and size.

Slurry Infrastructure Grant (SIG) Scheme

As discussed, you may be eligible for funding through this scheme to assist with the costs of upgrading your slurry infrastructure. The SIG opens in Autumn 2022 and offers a 50% grant towards the cost of:

- Building new or expanding existing slurry stores to provide 6 months storage
- Replacing stores that have reached the end of their design life and may be susceptible to leaks or failure
- A range of slurry store types
- Impermeable covers
- Extra equipment such as pumps, pipes and safety equipment

The grant will not cover:

- Storage capacity above 6 months – you can build more, but the grant will only contribute to 6 months

The minimum grant you can apply for is £25,000, and the maximum grant is £250,000 for each applicant business. Not everyone will get a grant in the first round. In the first year the RPA will prioritise projects with the biggest environmental impact, focusing on those located near protected sites. The RPA will publish details of locations to be prioritised before applications open.

You can find more details about the SIG here:

<https://www.gov.uk/government/publications/slurry-infrastructure-grant/about-the-slurry-infrastructure-grant>

2. Farm Summary

Home Farm is a tenanted unit which extends to approximately 320ha, and is located in the headwaters of the Darent and Cray catchment. In addition, the farmyard is hydrologically connected to the Sevenoaks Gravel Pits Site of Special Scientific Interest (SSSI). The farm has a combination of older and more modern buildings, mostly in a good state of repair.

Average annual rainfall (Source: AHDB Slurry Wizard, January 2021) is 775mm but may differ due to local climatic and topographical circumstances.

The main enterprise is a dairy unit of 190 head of German Holsteins. Current cropping includes wheat, maize and temporary grass. The farmyard is surrounded by permanent pasture for grazing, and a number of fields on the North Downs are in arable reversion. Approximately 70ha is in a Countryside Stewardship Scheme. A further 45ha of grassland at Chevening House is used for grazing heifers. Calving is an extended block from early September until late December. Livestock are housed at calving and turned out in March.

The farm lies outside the current NVZ area and therefore does not need to comply with NVZ regulations, but it does have to comply with the Farming Rules for Water introduced in April 2018, the Water resources (Control of pollution) (Silage, Slurry and Agricultural Fuel oil) Regulations 2010 as amended (SSAFO) and the Environmental Permitting Regulations (EPR).

Home Farm is in a Countryside Stewardship Water Quality priority, being medium priority for sediment issues. The farmstead is in an Impact Risk Zone (IRZ) for Westerham Wood and Scords Wood and Brockhoul Mount SSSI's. SSSI's and SAC's may be vulnerable to ammonia emissions and agricultural planning applications that fall within an IRZ are assessed for potential ammonia losses to the air.

For information; where a farm lies within the IRZ of a protected site (e.g. SSSI), then any proposal to construct new livestock housing or new slurry, digestate or manure storage may require ammonia emissions to be considered when submitting a planning application. There is a tool - **Simple Calculation of Atmospheric Impact Limits (SCAIL)** - <http://www.scail.ceh.ac.uk/index.html> - which can be used in supporting planning applications, both input and output files need to be submitted.


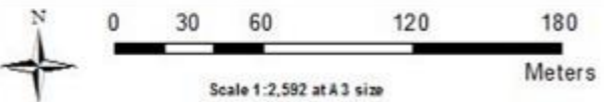
Following contact with your Catchment Adviser, the farm has been nominated for advice on Slurry and Manure Handling to look at compliance and suitability of existing facilities, and clean and dirty water handling. Recommendation of items within this report may improve the chances of support through Countryside Stewardship Water Grants.

3. Map 1 - Aerial View of Yards/Infrastructure

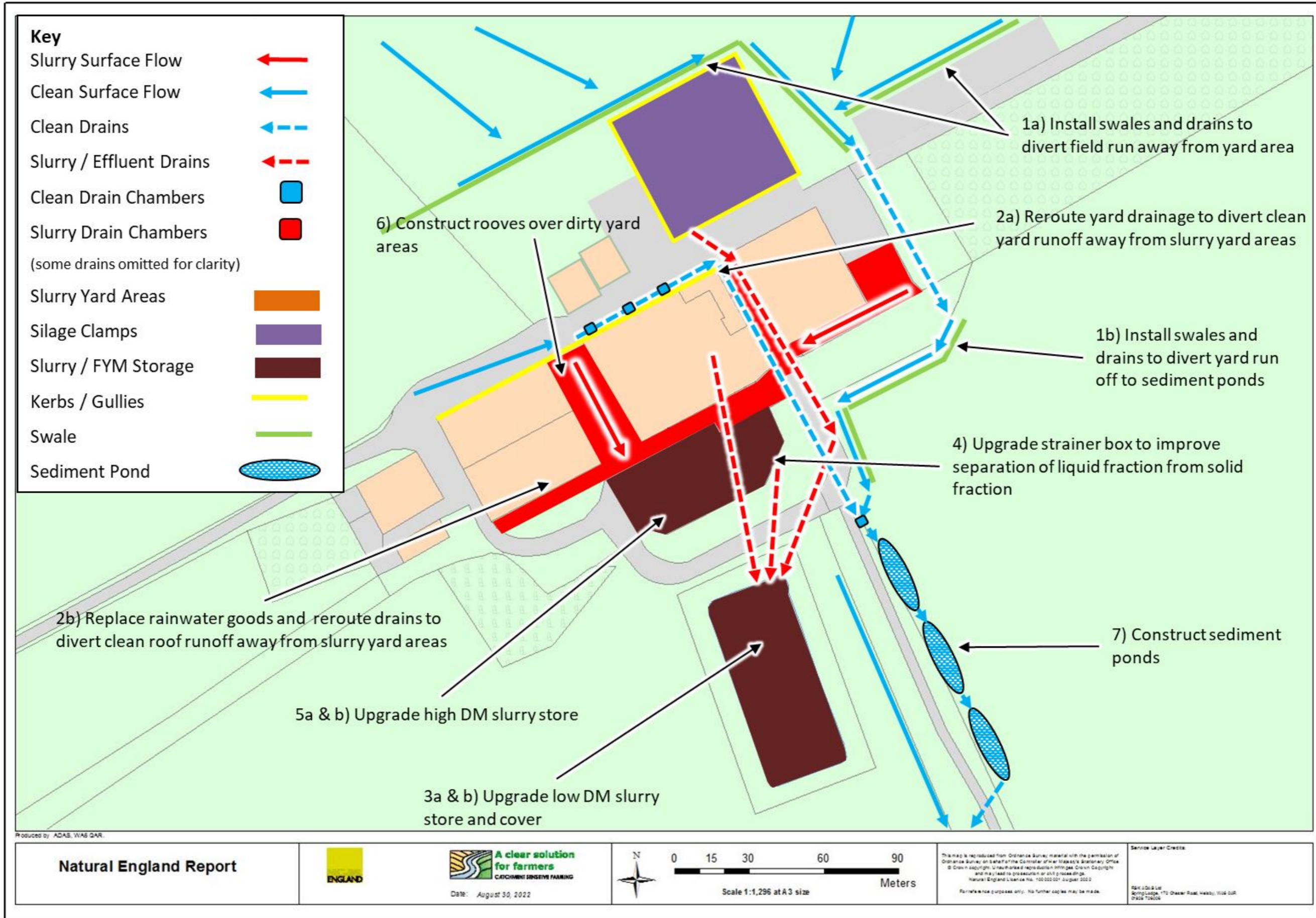


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<p>Natural England Report</p> 	 <p>A clear solution for farmers CATCHMENT ENDSIVE FARMING</p> <p>Date: August 30, 2022</p>	 <p>Scale 1:2,592 at A3 size</p>	<p><small>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. © Crown copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Natural England Licence No. 100 002 001 August 2022.</small></p> <p><small>For reference purposes only. No further copies may be made.</small></p>	<p><small>Remote Layer Credits: © 2022 Microsoft Corporation © 2022 Vector ONE Ltd (2022) DataBlox/Mapbox © 2022</small></p> <p><small>Map © 2022 WAG Spring Lodge, 110 Chester Road, Walsby, Lincs LN11 7JH</small></p>
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4. Map 2 – Recommendations: Details of Farmyard and Infrastructure Sketch



5. Table 1 – Options for Improving Slurry, Manure and Yard Runoff Handling and Storage

Priority Item	Detail of works			Partial Budgets for Recommendations	
	Recommendation for improving system and grants available	Estimation of benefit/problem that is being solved	Description of works required	Estimation of costs incurred before any potential grant and any savings	Payback Period for Capital Investments
<p>Currently storage capacity is deficient by 1170m³ for 4 months storage as required by SSAFO and by 3069m³ for 6 months storage as required for applications to the slurry infrastructure grant scheme</p> <p>Compliance can be achieved by reducing the volume of water entering the existing stores and addressing the concerns regarding the construction materials; or by expanding the capacity of the stores</p>					
1a & 1b	<p>Construct swales and drains to divert runoff from surrounding fields away from clean yard area and slurry yard area.</p> <p><u>Relevant Countryside Stewardship Grant:</u></p> <p>RP11 Swale £5.95 per square metre 900m² = £5,355</p> <p>RP13: Yard underground pipework - £5.50/m 100m = £550</p>	<p>Reduces field runoff water reaching yard and buildings and therefore volume of runoff potentially contaminated by draining over slurry yard areas.</p> <p>This will reduce the volume of water requiring management as slurry therefore reducing storage requirement and spreading required.</p>	<p>Excavate swales approx. 3m wide in the fields above the silage pits at the top of the farmyard, pipe under the roadway and along the far left of the farmyard.</p> <p>Excavate another swale of a similar size below the open feed yard and to the left of the track</p>	<p>Approx. 300m of swale, cost depends on work carried out with own labour but approx. £10 - £15/m = £3,000 to £4,500</p> <p>Approx. 100m of underground pipework, approx. £35/m = £3,500</p>	<p>£ 8,000 Payback over 5 years</p> <p>Interest payable @ 6%.</p> <p>Payments per month: £ 154.66</p> <p>Annual payments: £ 1855.95</p> <p>Total interest paid: £ 1279.74</p> <p>Total repaid: £ 9,279.74</p>
2a	<p>Renew yard drains to ensure clean yard run off and slurry yard run off are kept separate</p> <p><u>Relevant Countryside Stewardship Grant:</u></p> <p>RP15: Concrete yard renewal - £27.14/m² 140m² = £3,799.60</p> <p>RP13: Yard underground pipework - £5.50/m 70m = £385</p> <p>RP14: Yard inspection pit - £200/unit 2 = £400</p>	<p>Reduces volume of clean water reaching manure and slurry stores.</p> <p>This will reduce the volume of water requiring management as slurry, therefore reducing storage and spreading required.</p>	<p>Install new drainage to divert clean water away from the FYM and slurry stores</p>	<p>Approx. 70m of new drainage at approx. £35/m = £2,450</p> <p>Inspection Chambers approx. £400 each = £800</p>	<p>£ 3,250 Payback over 5 years</p> <p>Interest payable @ 6%.</p> <p>Payments per month: £ 62.83</p> <p>Annual payments: £ 753.98</p> <p>Total interest paid: £ 519.90</p> <p>Total repaid: £ 33,769.90</p>
2b	<p>Review and upgrade rainwater goods and drains to ensure roof water and slurry yard run off are kept separate</p> <p><u>Relevant Countryside Stewardship Grant:</u></p> <p>RP16: Rainwater goods - £11.40/m</p> <p>RP15: Concrete yard renewal - £27.14m²</p> <p>RP13: Yard underground pipework - £5.50/m</p> <p>RP14: Yard inspection pit - £200/unit</p>	<p>Reduces clean roof runoff water reaching manure and slurry stores.</p> <p>This will reduce the volume of water requiring management as slurry, therefore reducing storage and spreading required.</p>	<p>Fully investigate existing roof water drainage systems and upgrade and divert to clean water drainage system as necessary.</p>	<p>Subject to survey, assumed similar to item 2a</p>	<p>£ 3,250 Payback over 5 years</p> <p>Interest payable @ 6%.</p> <p>Payments per month: £ 62.83</p> <p>Annual payments: £ 753.98</p> <p>Total interest paid: £ 519.90</p> <p>Total repaid: £ 33,769.90</p>
3a	<p>Upgrade low DM slurry store to ensure compliance</p>	<p>Currently there is insufficient capacity for slurry and wash water production, increasing capacity to 4 months storage</p>	<p>The storage capacity required for current stocking numbers needs to be increased by 1170m³ for 4 months or 3069m³ for 6</p>	<p>Clay or synthetic lined lagoon* Approx. £32/m³ stored** = £187,808</p>	<p>£ 187,808 Payback over 15 years</p>

	<p><u>Possible Funding Stream:</u></p> <p>Slurry Infrastructure Grant (opens Autumn 2022)</p>	<p>will ensure compliance with SSAFO regulation, increasing to 6 months storage would future proof the farm.</p> <p>Additionally, there are concerns about the suitability of the materials used in the construction of the existing store which should be addressed as part of these works.</p>	<p>months capacity.</p>	<p>*Due to unsuitability of local clay and the need to import material, costs assumed to be similar</p> <p>**Some savings may be achieved on excavation costs by making use of the excavated area of the existing store.</p>	<p>Interest payable @ 6%.</p> <p>Payments per month: £ 1,584.83</p> <p>Annual payments: £ 19,017.97</p> <p>Total interest paid: £ 97,461.51</p> <p>Total repaid: £ 285,269.51</p>
3b	<p>Consider options to cover the low DM slurry store so that ammonia emissions can be reduced when slurry is being stored.</p> <p><u>Possible Funding Stream:</u></p> <p>Slurry Infrastructure Grant (opens Autumn 2022)</p>	<p>Helps to reduce ammonia emissions, while slurry is being stored, which helps to retain more nitrogen in the slurry, improving its financial value</p> <p>Assuming floating cover could be used on a low dry matter lagoon, this would divert a large quantity of rainfall away from the slurry store, which based on current storage volumes is an important consideration. Covering the low DM slurry store would reduce the volume of clean water entering the slurry system as rainwater by 552m³ (4 months M5) / 811m³ (6 months M5); and would reduce annual spreading by 1085m³.</p>	<p>Floating plastic cover – can be used on all lagoon types, reduces emissions by 60%, and can keep out rainwater which can be pumped off the surface. This would suit the low dry matter lagoon</p> <p>Floating leca Clay Aggregate Balls – can be used on all store types, they are easily pumped on, have a replacement rate of around 10% per year with 1m³ of product providing coverage for 10m². They do not keep out rainwater and may not work very well with higher dry matter slurry situations. This may suit the low dry matter lagoon</p> <p>Floating plastic Hexa Cover: They are applied to the surface of a store, and float together forming a barrier, reducing ammonia emissions by up to 90%, but they do not keep out rainwater, and may not work very well with high dry matter slurries. This may suit the low dry matter lagoon</p>	<p>Approx. £10/m²</p> <p>Approx. £7/m²</p> <p>Approx. £25/m²</p>	<p>Assuming a floating cover is used on a footprint similar to that of the existing store:</p> <p>£ 14,000 Payback over 5 years</p> <p>Interest payable @ 6%.</p> <p>Payments per month: £ 270.66</p> <p>Annual payments: £ 3,247.91</p> <p>Total interest paid: £ 2,239.55</p> <p>Total repaid: £ 16,239.55</p>
4	<p>Upgrade strainer box to improve separation of liquid from the high DM slurry store</p> <p><u>Possible Funding Stream:</u></p> <p>Slurry Infrastructure Grant (opens Autumn 2022)</p>	<p>Reduces volume of material requiring storage in the high DM store and requiring spreading.</p> <p>Saves labour regularly rodding the existing strainer box.</p>	<p>Remove current damaged system that currently isn't fit for purpose in the corner of the store and replace with new panels to create a weeping wall along the whole right side of the store</p>	<p>15m of spaced panels @ £240/m = £3,600</p>	<p>£ 3,600 Payback over 5 years</p> <p>Interest payable @ 6%.</p> <p>Payments per month: £ 69.60</p> <p>Annual payments: £ 835.18</p> <p>Total interest paid: £ 575.89</p> <p>Total repaid: £ 4,175.89</p>
5a	<p>Upgrade high DM slurry store to ensure compliance</p> <p><u>Possible Funding Stream:</u></p>	<p>Ensure sufficient capacity for 6 months production – 2286m³.</p>	<p>Assuming FYM can be stacked to 3m high, the store needs a minimum footprint of 730m² and the floor needs to gently slope towards the weeping wall.</p>	<p>730m² Concrete Floor @ £60/m² = £43,800</p> <p>115m Concrete Panel Walls to 3m @ £125/m</p>	<p>£58,175 Payback over 15 years</p> <p>Interest payable @ 6%.</p>

	Slurry Infrastructure Grant (opens Autumn 2022)			= £14,375	Payments per month: £ 490.91 Annual payments: £ 5,890.96 Total interest paid: £ 30,189.47 Total repaid: £ 88,364.47
5b	Roof high DM slurry store to reduce rainfall falling on area then requiring management, storage and spreading <u>Relevant Countryside Stewardship Grant:</u> RP28: Roofing (sprayer washdown area, manure storage area, livestock gathering area, slurry stores, silage stores) - £62/m ² 730m ² = £45,260	Reduces clean water to be stored and spread by 566m ³ annually	Construct a roof over the FYM store to BS5502 standard	Roofing to BS5502 730m ² @ £160/m ² = £116,800	£116,800 Payback over 15 years Interest payable @ 6%. Payments per month: £ 985.62 Annual payments: £ 11,827.50 Total interest paid: £ 60,612.46 Total repaid: £ 177,412.46
6	Construct rooves over dirty yard areas <u>Relevant Countryside Stewardship Grant:</u> RP28: Roofing (sprayer washdown area, manure storage area, livestock gathering area, slurry stores, silage stores) - £62/m ² 1110m ² = £68,820	Once roofed, rainfall on dirty yard areas becomes clean water and can be managed as such. Saves storing and spreading 860m ³ annually	Construct rooves to BS5502 standard over the dirty yard areas	Roofing to BS5502 Approx. 1110m ² @ £160/m ² = £177,600	£177,600 Payback over 15 years Interest payable @ 6%. Payments per month: £ 1,498.69 Annual payments: £ 17,984.28 Total interest paid: £ 92,164.15 Total repaid: £ 269,764.15
7	Vegetated Sediment Ponds <u>Relevant Countryside Stewardship Grant:</u> RP7: Sediment ponds and traps - £10/m ²	Capture sediment	Consider the need for sediment ponds if swales are constructed	Subject to survey and design	Subject to survey and design

6. Detailed Assessment of Current Situation and Possible Improvements

How compliant is your overall system with regulations?

The farm infrastructure at Home Farm presents a limited risk of pollution to the surrounding area as slurry, farmyard manure and silage effluent are all provided with collection and storage facilities. There are however elements of yard drainage which are not fully understood, and whilst it is believed that this is resulting in clean yard and roof water being stored as slurry rather than slurry contaminated water being discharged to drains this cannot be guaranteed. Additionally, there is insufficient storage capacity for all the slurry and yard run off currently produced, and risks of seepage runoff from some horse manure not being directed to the slurry system.

The system consists of mixed slurry and straw yard housing with excreta scraped to a high dry matter store which contains a strainer box from which the liquid fraction passes to an adjacent low dry matter slurry lagoon. Yard drainage, parlour washings and silage clamp effluent are piped directly to the lagoon.

Whilst the farm is not in an NVZ land conditions over winter may limit spreading opportunities. If it is not possible to empty the slurry lagoon there is a risk of overtopping of the banks and runoff from the lagoon. If this runoff reaches a watercourse (there is a ditch adjacent to the lagoon) this would be in breach of Environmental Permitting Regulations as an uncontrolled discharge of polluting material.



Image 1 – Scrape Ramp, High Dry Matter Slurry Store and Strainer Box



Image 2: Low Dry Matter Slurry Lagoon

Description of silage store and effluent management:

The silage pits were constructed in 2010 and appear to be compliant with SSAFO requirements. Effluent is collected in external drains and piped to the slurry lagoon.

Description of manure storage and management:

All yard and cubicle shed slurry scrapings and straw yard muck is stored initially in the high dry matter slurry store which sits below the farmyard. This is constructed so seepage / slurry is retained and runs to the strainer box. The size of the strainer box means this is not as efficient in separating solid and liquid fractions as a longer weeping wall type design would be.

The low dry matter slurry store has insufficient capacity for 4 months storage and therefore is not compliant with SSAFO regulations, however it's construction pre 1991 makes it an exempt structure. Structures built before 1991 which have not been substantially modified or enlarged are deemed to be exempt from the requirements of the SSAFO regulations, provided that the EA do not consider them to pose an unacceptable risk of pollution. Where this is the case the Agency can serve a notice requiring the facility to be brought up to some or all the standards of the regulations.

Description of yard runoff management:

Currently the majority of yard runoff passes through the slurry yard and into the high dry matter slurry store or through the yard drains to the low dry matter slurry lagoon, some clean drainage passes to the ditch adjacent to the slurry lagoon. If as proposed in this report yard drainage is redirected to separate all clean water and divert this straight to the ditch there may be a requirement for enhanced sediment trapping, the proposals allow for this but a water holding structure design visit would be recommended to ensure these are designed and appropriately sized for the volumes of yard run off being dealt with.

Calculation of existing storage needs (in line with SSAFO/NVZ rules) and description of any shortfall:

Any figures quoted are based on information provided during the visit or subsequent approximate measurements taken from GIS mapping tools. If it is considered that numbers are different, please amend the figures as appropriate.

Rainfall figures used in this section are derived from AHDB's Slurry Wizard. Average annual rainfall = 775mm, average Winter (October-February) rainfall = 367mm, 6 months M5 (worst in 5 years) = 580mm.

4 months figures are included to assess compliance with SSAFO storage requirements, 6 month figures as this will be the baseline for any funding available through the Slurry Infrastructure Grant scheme and 12 months figures are included to show volume of material requiring spreading derived from these areas in total as all drainage to the lagoon will require spreading.

Table 2: 6 months winter rainfall figures, millimetres, M5 adjusted

Oct	Nov	Dec	Jan	Feb	Mar	Total
102	107	107	106	74	84	580

Table 3: Amount of clean water to be stored (rainfall):

Part of Farmyard	Area (m ²)	4 months M5 (m ³)	6 months M5 (m ³)	12 months (m ³)
Clean yards above road and above open feed yard	910	359	527	705
Rainfall on building roofs – cubicle sheds, straw yard and parlour (40% of which is going into the lagoon)	1112	438	644	862
Rainfall on high DM slurry store	730	288	423	566
Rainfall on low DM slurry store	1400	552	811	1085
Total:		1637	2405	3218

Table 4: Amount of wash water and silage clamp runoff to be managed (currently):

Part of Farmyard	Area (m ²)	4 months M5 (m ³)	6 months M5 (m ³)	12 months (m ³)
Parlour Washings (1m ³ per cow per month)		760	1140	2280
Runoff from Silage Clamps	1980	780	1146	1535

Table 5: Amount of slurry yard runoff to be managed (currently):

Part of Farmyard	Area (m ²)	4 months M5 (m ³)	6 months M5 (m ³)	12 months (m ³)
Between buildings, above high DM slurry store and open feed yard	1110	437	643	860
Total:		437	643	860

Table 6: Calculation of Manures currently produced on the farm

	Monthly Volume of Excreta (m ³)	Stocking	Housing (months)	Monthly Production (m ³)	Total Production (m ³)	% as Slurry	% as FYM	Monthly Slurry Production (m ³)	Monthly FYM Production (m ³)
Dairy cow >9000lt	1.92	190	6	365	2189	74	26	270	95
Dairy heifer 12 months to first calf	1.2	30	1	36	36	0	100	0	36
Calf <2 months	0.21	190	0.5	40	20	0	100	0	20
Breeding Bull >24 months	0.78	2	6	2	9	0	100	0	9
Horse	0.962	7	6	7	40	0	100	0	40
Total monthly:								270	201
1/3 Strainer Box Separated Liquid Portion (monthly):								89	
2/3 Strainer Box Separated Solid Portion (monthly):									181
Monthly production (m³):								89	381

Table 7: Calculation of existing storage requirements and estimation of any shortfall

	4 months (M5)	6 months (M5)	12 months
Clean Water (yard and rooves)	797 m ³	1,171 m ³	1,567 m ³
Clean Water (falling onto slurry stores)	840 m ³	1234 m ³	1651 m ³
Wash water	760 m ³	1140 m ³	2280 m ³
Silage Clamp Runoff	780 m ³	1146 m ³	1535 m ³
Slurry Yard Runoff	437 m ³	643 m ³	860 m ³
Slurry	356 m ³	535 m ³	535 m ³ *
Total	3970 m³	5869 m³	8428 m³

*Annual production taken as 6 month housing period

Taking into account the freeboard allowance, the existing slurry lagoon has a capacity of 2,800m³. Therefore, to comply with SSAFO requirements for 4 months storage there is currently a shortfall of 1,170m³. To comply with 6 months storage there is a shortfall of 3,069m³ based on existing volumes to be stored.

If all the clean yard and roof water is diverted and both slurry stores are covered, the existing storage is sufficient for 4 months M5 storage capacity. The suitability of the construction of the low DM slurry store requires investigation and if significant alterations are to be made or grants applied for, the structure must meet SSAFO requirements as it would no longer be considered an exempt structure. If you are considering applying for funding under the new Slurry Infrastructure Grant scheme the store must have 6 months storage capacity.

Whilst the initial capital outlay for roofing and covering will be higher there will be significantly less material requiring management, reducing the annual costs of spreading as outlined in section 7.

7. Overall Financial Assessment

Business profit / available cash

The financial data from the end of year accounts indicates that the farm business has made a profit annually over the last three years, see the table below. However, when demands on this available cash are taken into consideration the business is in a negative cash position in two of the last three years.

Table 8: Farm profits over the 3 years to 31st March 2021

	2019	2020	2021	Average
Profit	£102,376	£72,579	£33,168	£69,374
Depreciation	£61,700	£38,026	£37,371	£45,699
Available Cash	£164,076	£110,605	£70,539	£115,073
Drawings	£63,168	£79,137	£93,664	£63,168
Capital Introduced	£0	£0	£0	£0
Tax Paid	£48,860	£5,954	£26,006	£26,940
Net Drawings	£112,028	£85,091	£119,670	£105,596
HP capital repayments *		£18,172	£8,775	£13,474
Loan capital repayments **	£0	£0	£0	£10,000
Net Capital expenditure	£45,682	£9,730	£9,137	£21,516
Capex and Loan Repayments	£45,682	£27,902	£17,912	£44,990
Total cash requirement	£157,710	£112,993	£137,582	£150,586
Cash Surplus/Deficit	£6,366	- £2,388	- £67,043	- £35,513

*New HP taken out in 2019 shows negative value in accounts for repayments this year

** Bounce back loan taken out in 2021 will be repaid at £10,000 / annum for next 5 years

Current BPS for 2022 is around £53,600 down from more than £70,000 in 2020 (the year used for the following benchmarking exercise). Alternative agri-environment schemes are being implemented to maximise the income available from these including HLS and SFI. The 2022 budget provided shows a projected profit of £281,794 after depreciation has been added back in, with private drawings and tax of £80,000 and capital requirement of £57,000, leaving a cash surplus of £144,794. This suggests that since the March 2021 year end accounts significant changes have been made to business to improve profitability and efficiency, presuming the budget figures can be achieved.

Costs of options with detailed financial analysis

Table 9: Project costs, repayment periods and potential savings

Item	Total cost*	Repayment period	Annual Repayment @ 6% interest	Annual Savings	Net Annual Cost
Divert clean water from yards and rooves away from FYM and slurry store	£14,500	5	£3,363.91	Reduction of spreading volume by 1567m ³ @ £1.00/m ³ application £1,567**	£1,796.91
Upgrading low DM slurry store	£187,808	15	£19,017.97		
Covering low DM slurry store	£14,000	5	£3,247.91	Reduction of spreading volume by 1085m ³ @ £1.00/m ³ application £1,085	£2162.91
Upgrading high DM slurry store	£58,175	15	£5,890.96		
Roof high DM slurry store	£116,800	15	£11,827.50	Reduction of spreading volume by 566m ³ @ £1.00/m ³ application £566	£11,261.50
Upgrade FYM store Strainer Box	£3,600	5	£835.18	Labour to clean out through the year	
Construct rooves over dirty yard areas	£177,600	15	£17,984.28	Reduction of spreading volume by 860m ³ @ £1.00/m ³ application £860	£17,124.28

*The above table does not include grant funding which may be available

**The volume of water entering the yards and store from the hillside is currently unknown but these costs include the diversion of this

Whole Farm Performance

In the table below, the business has been benchmarked in terms of gross margin performance in the 2021 financial year, to that of the closest available similar sized farm. This has been done by using the Farm Business Survey dataset for a large dairy farm, there are however significant differences between the 'average' farm and this business, with the benchmark farm having less than half the land area and around double the stock numbers. Unfortunately for this business the profit is less than the farms BPS subsidy payments and stewardship income. However as mentioned previously the budget figures for 2022 show much stronger performance presuming this can be achieved.

On the table below I have highlighted in red those costs which are greater than the benchmarked average and in green those costs which are lower.

Table 10: Whole Farm Performance

Profitability Measures (£ per farm unless stated otherwise)	FBS values March 2020	FBS values (per Ha)	Your values (per Farm)	Comparison with FBS	Your values (per Ha)	Comparison with FBS (per Ha)
Total farmed area (ha)	170	-	360	190.2	-	-
Farm Output						
Sales (a)	£264,610	£1,558	£680,845	£416,235	£1,891	£333
Subsidies (b)	£49,102	£289	£107,073	£57,971	£297	£8
Cost of Sales (c)	£81,098	£478	£359,347	£278,249	£998	£521
Gross profit [a+b-c] (d)	£232,614	£1,370	£428,571	£195,957	£1,190	-£179
Fixed Costs						
Wages and salaries	£13,905	£82	£63,154	£49,249	£175	£94
Machinery repairs	£12,544	£74	£38,282	£25,738	£106	£32
Machinery fuel and oil	£12,238	£72	£12,000	-£238	£33	-£39
Contract work	£20,400	£120	£68,240	£47,840	£190	£69
Other machinery and motor expenses	£1,768	£10	£2,064	£296	£6	-£5
Rent	£16,393	£97	£72,890	£56,497	£202	£106
Rates	£916	£5	£0	-£916	£0	-£5
Power, electricity and heat	£4,018	£24	£3,786	-£232	£11	-£13
Property repairs	£8,054	£47	£13,925	£5,871	£39	-£9
Professional fees	£5,401	£32	£12,398	£6,997	£34	£3
Bank interest and charges	£7,069	£42	£1,497	-£5,572	£4	-£37
Insurance costs	£7,396	£44	£6,304	-£1,092	£18	-£26
Other overheads	£7,955	£47	£7,192	-£763	£20	-£27
Total Overheads excluding Depreciation	£118,057	£695	£301,732	£183,675	£838	£143
Machinery Depreciation	£30,269	£178	£38,026	£7,757	£106	-£73
Buildings Depreciation	£7,269	£43	£0	-£7,269	£0	-£43
Total Depreciation	£37,538	£221	£38,026	£488	£106	-£115
Total Overheads (e)	£155,594	£916	£339,758	£184,164	£944	£27
Net profit [d-e]	£77,020	£454	£88,813	£11,793	£247	-£207

8. Implications of NOT Undertaking Recommendations

Unless changes are made to farm infrastructure you will fail to meet the current environmental regulations in relation to slurry storage et cetera. You advised of a potential pollution incident several years ago, and failure to address the current infrastructure shortfall will mean that you are at high risk of causing another pollution incident.

Careful consideration should be given to all options to make sure that the right solution is implemented to ensure compliance with current regulations and with a view to regulatory compliance in the future, for example by ensuring provision is made for at least four months, but ideally 6 months, storage. You should also recalculate the storage once a new system is decided upon to make sure all of the regulatory storage requirements are met.

9. What and Who Can Help?

Catchment Adviser: Daniel Creech

**Catchment Adviser
Telephone number: 07775 555943**

10. Appendix 1 – Further Information and Regulations

Regulatory requirements

The Water Resources (Control of Pollution) (Silage, Slurry, and Agricultural Fuel Oil) Regulations (England) (SSAFO) apply to structures built, substantially reconstructed or enlarged since 1991 for the storage of manures, slurries, silage and agricultural fuel oil. The regulations stipulate location, size and construction performance standards. You must notify the Environment Agency (EA) of your plans **two weeks before starting any construction**. Plans will need to be agreed with the EA which may involve a site visit. You are strongly advised to consult the EA at an early stage, in order to ensure that your proposals are acceptable and minimise the risk of abortive works.

Guidance on how to comply with the Regulations can be found at:

<https://www.gov.uk/guidance/storing-silage-slurry-and-agricultural-fuel-oil>

The Construction Industry Research and Information Association (CIRIA) has updated guidance entitled **Livestock manure and silage storage infrastructure for agriculture (C759F)** that incorporates the amendment of the SSAFO Regulations in 2010, the introduction of new relevant regulations and the evolution of the construction and storage technologies. It provides up-to-date information on the selection, sizing, costs associated with livestock manure and silage storage as well as on the issues that may arise during the design, construction and operation phases. **Download directly from the Resources section of www.ciria.org.uk to ensure you refer to the latest version: C759F**

NVZ rules

The Nitrate Pollution Prevention Regulations 2015 (amended 2016) aim to reduce water pollution by nitrate from agricultural sources, and prevent further pollution. Within areas designated as Nitrate Vulnerable Zones the key requirements are:

- minimum storage periods and capacities for livestock manures
- closed periods for spreading all organic manures with high available N
- nitrogen fertiliser planning,
- maximum stocking and application rates for manufactured fertiliser and all organic manures,
- and spreading controls.

Details of how to comply with the NVZ minimum storage requirements can be found through the Defra GOV.UK website: <https://www.gov.uk/guidance/storing-organic-manures-in-nitrate-vulnerable-zones>

The Environmental Permitting Regulations 2016 (EPR)

Under the EPR, a person is required to hold an environmental permit when carrying out any water discharge activity or groundwater activity unless that activity is specifically exempted from this requirement under the regulations, i.e.

12.—(1) A person must not, except under and to the extent authorised by an environmental permit—

(a) operate a regulated facility, or

(b) cause or knowingly permit a water discharge activity or groundwater activity.

(A regulated facility includes a water discharge activity or groundwater activity under the regulations).

Under regulation 38 to EPR 2016 it is an offence for a person to contravene Regulation 12 or knowingly cause or knowingly permit a contravention of Regulation 12(1)(a). In effect this means it is an offence to cause or knowingly permit any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters (such as all coastal or inland waters, including lakes, ponds, streams, canals and ditches) or to allow the input of pollutant substances to groundwater, without the prior written consent from the EA. **Environmental Permits for water discharge activities and groundwater activities are issued by the Environment Agency under these regulations.**

These Regulations also enact the groundwater requirements of several European Directives. They aim to protect groundwater from pollution by controlling activities that might lead to direct or indirect inputs of pollutants to groundwater. Pollutants can be either:

- Hazardous substances – these are toxic, persistent and liable to bio-accumulate. They include mercury, hydrocarbons, pesticides, sheep dip, solvents and radioactive substances. We must take all reasonable and necessary measures to prevent their input to groundwater
- Non-hazardous pollutants – these are less harmful and include all pollutants that are not a hazardous substance. Examples include ammonia, nitrate and certain biocides. The input of non-hazardous pollutants to groundwater must be limited to prevent pollution occurring.

An **environmental permit** (as a groundwater activity) is required for any disposal of waste sheep dip or pesticides washings to land.

For further information please see:

<https://www.gov.uk/topic/environmental-management/environmental-permits>

Farming Rules for Water

Whilst the final interpretation of the Farming Rules for Water is still being established, the underlying regulations require that no manure is applied where there is no demonstrable crop need. For Autumn application demonstrable crop need is only given for a limited range of crops including oilseed rape and grass. There is no demonstrable crop need for winter cereals. Regulatory Position Statement 252 updated in October 2021 provided the option for Autumn 2021 to contact the EA if you wished to apply manures where there was no demonstrable crop subject to working

through a hierarchy of alternative options for management of the manure. This option expires in March 2022, as yet no updated guidance has been issued so you should presume that you will not be able to spread manures containing nitrogen on land where there is no demonstratable crop need in Autumn 2022.

The Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018 (Farming Rules for Water) seek to prevent agricultural diffuse pollutants from organic manure, manufactured fertiliser and soil harming human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems (e.g. pollution of watercourses and coastal waters, or springs, wells or boreholes, by means of soil erosion and leaching). They apply to all agricultural land in England, including NVZ.

The key requirements cover:

- Use and storing organic manures or manufactured fertiliser
- Planting and harvesting
- Soil management
- Managing livestock on farmed land

Details of how to comply with the rules can be found through the Defra GOV.UK website <https://www.gov.uk/guidance/rules-for-farmers-and-land-managers-to-prevent-water-pollution>

Additional guidance on the regulations [Applying the farming rules for water - GOV.UK \(www.gov.uk\)](http://www.gov.uk/guidance/applying-the-farming-rules-for-water)

Health and Safety

Any risk to health and safety associated with the workplace must be assessed in accordance with the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1992.

Substances that are known to be hazardous need to be assessed against the Control of Substances Hazardous to Health (COSHH) 1994 Regulations.

Construction (Design and Management) Regulations 2015 – see

<http://www.legislation.gov.uk/ukxi/2015/51/regulation/2/made>

Will apply to:

- Any construction design work, irrespective of how long the construction phase lasts or how many workers are involved on site.
- All demolition work proposed and any construction work that lasts for more than 30 days, or involves more than 500 person days of work. These must be notified to the local Health and Safety Executive, before commencement, using form F10.
- Non-notifiable construction work which involves five people or more carrying out construction work at any one time.

For further information please see: <http://www.hse.gov.uk/pubns/indg411.htm>

Planning – see <https://www.gov.uk/planning-permissions-for-farms>

The construction of buildings and engineering structures (such as slurry stores, channels, reception pits and silage silos) falls within UK planning legislation. Any major works under consideration are likely to require **planning permission**.

Any new building, structure, tank or excavation for the storage of manure, slurry, silage and lightly fouled water which is to be built within 400 metres of the curtilage of a 'protected' building requires planning permission.

A 'protected' building is one that is occupied by people on a regular basis, such as a private dwelling or school. The definition excludes a dwelling or other buildings that are used for or in connection with agriculture.

The 400 metre rule is in addition to other restrictions on permitted development for agriculture, such as that of 'within 25 metres of the metalled portion of a road'.

From 2 January 1992, even if full planning permission is not required, the local planning authority will require to be informed of the siting, construction and size of any planned agricultural buildings and any engineering operations on any size of agricultural unit.

Smaller agricultural units of 0.5 to 5.0 hectares have more restricted development rights.

- Where an agricultural development lies within an Impact Risk Zone (IRZ) for a Site of Special Scientific Interest (SSSI) the planning authority may need to consider ammonia emissions from the development as part of the planning process. This usually applies to new livestock housing, slurry stores or manure stores but will depend on the type and size of the development. The location of IRZs and the types and sizes of developments likely to be affected are shown on [MAGIC](#) (Designations > Land-Based Designations > Statutory > SSSI Impact Risk Zones). They have also been published as a GIS dataset which is available to download from <https://naturalengland-defra.opendata.arcgis.com> as an ESRI ArcMap Shapefile and used in combination with other spatial data in the user's GIS. If a development falls within the criteria for consideration then the applicant will need to supply relevant information derived from [SCAIL](#).

Ensure that you have checked with your local planning authority before you embark on any construction which may require planning permission.



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