

Agricultural Benefit Statement

For the application of beneficial wastes to fields at;

Cae Gwyn, Cyffyllog, Ruthin, Denbighshire, LL15 2DP

9th March 2026

1 Person with appropriate technical expertise and permit details

This benefit statement has been compiled by Dawn Loos (Lead Consultant at 4R Group) who has the following qualifications and experience:

- B.Agric – Plant production
- PGDip – Agronomy
- MSc - Sustainable Agriculture
- 3 years of agronomic experience
- 4R Group Deployment Training Course
- Facts Qualified Advisor (FE/7676)

Verified by Jonathan Lloyd; FACTS Qualified Advisor (No. FE/ 4524)

Permit number under which this deployment application is being made: EPR/GP3792SK

2 Where the waste is to be spread

Table 1. Where the waste is to be spread

<i>Farm address:</i>	Cae Gwyn, Cyffyllog, Ruthin, Denbighshire, LL15 2DP	
<i>Stockpile grid reference:</i>	Refer to Table 4	
<i>Area of the receiving land:</i>	49.44 ha	
<i>Quantity to be stored at any one time:</i>	Stackable: 3000	Non-Stackable: NA
<i>Total maximum quantity to be spread:</i>	9,300 t	
<i>Location map document reference:</i>	CG_01	

3 What is the waste to be spread

Table 2. Description of waste(s) to be applied

Waste	EWC Code	Description	Waste Producer	Additional Information
1	19 09 02	Sludges from water clarification. Potable water treatment effluent.	DCWW Alwen	Stackable ferric sludge cake
2	19 09 02	Sludges from water clarification. Potable water treatment effluent.	DCWW Glascoed	Stackable ferric sludge cake
3	19 09 02	Sludges from water clarification. Potable water treatment effluent.	DCWW Alaw	Stackable alum sludge cake

4 Operational details

4.1 Cropping details

Table 3. Cropping details

<i>Current crop including projected yield if known:</i>	Refer to tables 6-8
<i>Is straw removed?</i>	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
<i>Following crop and any sensitive crops within rotation which you are amending the soil for in good time:</i>	Refer to tables 6-8
<i>When do you intend to apply this waste; e.g. post harvest – pre-ploughing, during seed bed cultivations, on the stubble over winter:</i>	<p>Spreading will only take place subject to ground conditions and following the Code of Good Agricultural Practice (Defra, 2011), Farming Rules for Water, NVZ regulations and the permit holder's Environmental Management System (EMS).</p> <p>Spreading will also comply with the Water Resources (Control of Agricultural Pollution) Wales Regulations 2021,</p> <p>Targeted periods of spreading DCWW wastes on grass fields are from late Feb to May and after cutting of silage (June-October) 2026 to allow for grassland fields to have use of late autumn grazing prior to deployment expiry as per the RB209 (2023).</p> <p>DCWW waste applications will be split into 50t/ha applications applied an applicable number of times to supply the indicated nutrients as per the nutrient charts below (i.e. at a recommendation of 197t/ha, 4 applications will be made).</p>

	<p>No more than 50t/ha of liquid sludge will be spread on a field in any 3-week period in accordance with CoGAP, and no more than 250t/ha will be spread within any 12-month period.</p> <p>Notification will be given prior to the commencement of spreading.</p>
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4.2 Waste storage

Table 4. Waste storage

<p><i>How is the waste to be stored?</i></p> <p><i>e.g. mobile tank, field heap, spread on delivery</i></p>	<p>Stackable wastes: Field stockpile</p> <p>Non-stackable wastes: NA</p>
<p><i>Where is the waste to be stored prior to spreading?</i></p>	<p>Field stockpiles</p> <p>A. SJ 03840 55436</p> <p>B. SJ 04595 56137</p> <p>C. SJ 04024 55591</p> <p>D. SJ 04290 55800</p>
<p><i>Why were these storage locations chosen?</i></p>	<p>The stockpile locations were chosen due to their suitable location relative to the spreading fields and availability for use. It is not within 10m of any ditch, watercourse, or footpath, not within a SPZ1, and is at least 50m from any well spring or borehole.</p>
<p><i>Additional storage information</i></p>	<p>Only waste as specified in this deployment will be stored in the proposed storage location.</p> <p>Different waste types will not be mixed.</p> <p>No more than 3000t will be stored collectively across all storage locations at any given time.</p>

4.3 Waste application

Table 5. Waste application

<p><i>How is the waste to be spread and why is it to be spread that way?</i></p>	<p>The wastes can be spread using conventional farming application techniques – through a standard muck spreader. The wastes are not malodorous and will not emit odour if spread in this way.</p>
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<p><i>How do you plan to incorporate the waste following application?</i></p>	<p>There is no requirement for further incorporation of wastes on grass fields due to low ammonia content of DCWW sludge and minimal odour.</p> <p>The fields may be chain harrowed after application, if required.</p>
<p><i>With liquid wastes is there any mole draining or sub-soiling planned? Are there land drains in the field?</i></p>	<p>No</p> <p>Yes</p>
<p><i>Other relevant operational information:</i></p>	<p>The wastes may be applied separately or in combination. If the wastes are applied in combination the total combined amount applied will not exceed 250t/ha, the total nitrogen loading will be less than 250kg/ha, and the amount of available nitrogen and total or available phosphate and potash (whichever is appropriate) will not exceed the fertiliser recommendation or the amount removed in crop offtake, whichever is the greater.</p>

Table 6. DCWW Alwen

Nutrient Requirements for Land at Cae Gwyn

Field Reference	Total Area	Sprd Area	Previous Crop	Next Crop	pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes		
						SNS	Req	*In	P Ind	Req	Crop Use	*In	K Ind	Req	Crop Use	*In	Mg Ind			Req	*In
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha			kg/ha	kg/ha
1	4.57	3.55	Grass	Grazing	5.3	M	150	1.2	0	80	17	64.5	1	30	58	9.1	1	0	3.7	197	699
2	10.93	9.15	Grass	Grazing	5.6	M	150	1.2	0	80	17	64.5	1	30	58	9.1	2	0	3.7	197	1803
3	5.31	8.29	Grass	Grazing	6	M	150	1.2	0	80	17	64.5	1	30	58	9.1	2	0	3.7	197	1633
4	11.14	9.36	Grass	Grazing	5.6	M	150	0.9	1	50	17	49.1	2+	0	58	7.7*	2	0	2.8	150	1404
5	5.56	5.00	Grass	Grazing + 1 cut	5.7	M	180	1.2	1	120	56	64.5	2-	80	196	10.1*	2	0	3.7	197	985
6	4.55	4.33	Grass	Grazing + 1 cut	5.6	M	180	1.2	0	180	56	64.5	0	140	196	9.1	1	0	3.7	197	853
7	6.83	6.35	Grass	Grazing + 1 cut	5.1	M	180	1.2	1	120	56	64.5	1	110	196	9.1	1	0	3.7	197	1251
Swedes	3.51	3.41	Grass	Grazing	5.7	M	150	1.2	0	80	17	64.5	1	30	58	9.1	1	0	3.7	197	672
Ha	52.40	49.44																			9300

Nutrient requirement based on values for grass with 1 cut of silage with aftermath grazing/ just grazing (target DM yield 9-12t/ha) described in RB209 (2023)

Grazing crop use based on yield totalling 12t/ha where 1.4kg/t P₂O₅ and 4.8kg/t K₂O removed in offtake (RB209, 2023)

Grazing + 1 cut crop use based on yield totalling 23t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O + 12t/ha where 1.4kg/t P₂O₅ and 4.8kg/t K₂O removed in offtake (RB209, 2023)

*N, P₂O₅, K₂O and Mg stated are **available** concentrations in units of kg/ha

****Total** P₂O₅ and K₂O stated where soil indices ≥2

Total N supplied at an application rate of 197t/ha is 249.7kg/ha

Table 7. DCWW Glascoed

Nutrient Requirements for Land at Cae Gwyn

Field Reference	Total Area	Sprd Area	Previous Crop	Next Crop	pH	N			P ₂ O ₅				K ₂ O				Mg			Rate t/ha	Totals tonnes		
						SNS	Req	*In	Ind	Req	Crop Use	*In	Wst	Ind	Req	Crop Use	*In	Wst	Ind			Req	*In
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha			kg/ha	kg/ha
1	4.57	3.55	Grass	Grazing	5.3	M	150	1.1	0	80	17	61.9	1	30	58	33.9	1	0	26.5	186	660		
2	10.93	9.15	Grass	Grazing	5.6	M	150	1.1	0	80	17	61.9	1	30	58	33.9	2	0	26.5	186	1702		
3	5.31	8.29	Grass	Grazing	6	M	150	1.1	0	80	17	61.9	1	30	58	33.9	2	0	26.5	186	1542		
4	11.14	9.36	Grass	Grazing	5.6	M	150	0.9	1	50	17	49.9	2+	0	58	30.4*	2	0	21.3	150	1404		
5	5.56	5.00	Grass	Grazing + 1 cut	5.7	M	180	1.1	1	120	56	61.9	2-	80	196	37.7*	2	0	26.5	186	930		
6	4.55	4.33	Grass	Grazing + 1 cut	5.6	M	180	1.1	0	180	56	61.9	0	140	196	33.9	1	0	26.5	186	805		
7	6.83	6.35	Grass	Grazing + 1 cut	5.1	M	180	1.1	1	120	56	61.9	1	110	196	33.9	1	0	26.5	186	1181		
Swedes	3.51	3.41	Grass	Grazing	5.7	M	150	1.1	0	80	17	61.9	1	30	58	33.9	1	0	26.5	186	634		
Ha	52.40	49.44																			8859		

Nutrient requirement based on values for grass with 1 cut of silage with aftermath grazing/ just grazing (target DM yield 9-12t/ha) described in RB209 (2023)

Grazing crop use based on yield totalling 12t/ha where 1.4kg/t P₂O₅ and 4.8kg/t K₂O removed in offtake (RB209, 2023)

Grazing + 1 cut crop use based on yield totalling 23t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O + 12t/ha where 1.4kg/t P₂O₅ and 4.8kg/t K₂O removed in offtake (RB209, 2023)

*N, P₂O₅, K₂O and Mg stated are **available** concentrations in units of kg/ha

****Total** P₂O₅ and K₂O stated where soil indices ≥2

Total N supplied at an application rate of 186t/ha is 210.3kg/ha

Table 9. DCWW Alaw

Nutrient Requirements for Land at Cae Gwyn

Field Reference	Total Area	Sprd Area	Previous Crop	Next Crop	pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes		
						SNS	Req	*In	Ind	Req	Crop Use	*In	Ind	Req	Crop Use	*In	Ind			Req	*In
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha			kg/ha	kg/ha
1	4.57	3.55	Grass	Grazing	5.3	M	150	0	0	80	17	0	1	30	58	0	1	0	0	0	0
2	10.93	9.15	Grass	Grazing	5.6	M	150	0	0	80	17	0	1	30	58	0	2	0	0	0	0
3	5.31	8.29	Grass	Grazing	6	M	150	9.4	0	80	17	48.2	1	30	58	7.7	2	0	3	144	1194
4	11.14	9.36	Grass	Grazing	5.6	M	150	0	1	50	17	0	2+	0	58	0	2	0	0	0	0
5	5.56	5.00	Grass	Grazing + 1 cut	5.7	M	180	0	1	120	56	0	2-	80	196	0	2	0	0	0	0
6	4.55	4.33	Grass	Grazing + 1 cut	5.6	M	180	0	0	180	56	0	0	140	196	0	1	0	0	0	0
7	6.83	6.35	Grass	Grazing + 1 cut	5.1	M	180	0	1	120	56	0	1	110	196	0	1	0	0	0	0
Swedes	3.51	3.41	Grass	Grazing	5.7	M	150	0	0	80	17	0	1	30	58	0	1	0	0	0	0
Ha	52.40	49.44																			1194

Nutrient requirement based on values for grass with 1 cut of silage with aftermath grazing/ just grazing (target DM yield 9-12t/ha) described in RB209 (2023)

Grazing crop use based on yield totalling 12t/ha where 1.4kg/t P₂O₅ and 4.8kg/t K₂O removed in offtake (RB209, 2023)

Grazing + 1 cut crop use based on yield totalling 23t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O + 12t/ha where 1.4kg/t P₂O₅ and 4.8kg/t K₂O removed in offtake (RB209, 2023)

*N, P₂O₅, K₂O and Mg stated are **available** concentrations in units of kg/ha

****Total** P₂O₅ and K₂O stated where soil indices ≥2

Total N supplied at an application rate of 144t/ha is 249kg/ha

5 Compliance with NVZ regulations

Table 14. Compliance with NVZ regulations

<p><i>Does the site fall within a designated NVZ?</i></p>	<p>Y <input checked="" type="checkbox"/> N <input type="checkbox"/> (skip to section 6)</p>																														
<p><i>Do closed periods apply for the wastes to be applied?</i></p>	<p>Y <input type="checkbox"/> N <input checked="" type="checkbox"/></p> <p>Applicable to:</p> <p>If yes, please indicate the appropriate period:</p> <table border="1" data-bbox="706 632 1344 856"> <thead> <tr> <th>Start Date</th> <th>End Date</th> <th>Land Use</th> <th>Soil Type</th> <th></th> </tr> </thead> <tbody> <tr> <td>1st Aug</td> <td>31st Dec</td> <td>Tillage Land</td> <td>Shallow/Sandy</td> <td><input type="checkbox"/></td> </tr> <tr> <td>1st Sept</td> <td>31st Dec</td> <td>Grassland</td> <td>Shallow/Sandy</td> <td><input type="checkbox"/></td> </tr> <tr> <td>16th Sept</td> <td>31st Dec</td> <td>Tillage Land*</td> <td>Shallow/Sandy</td> <td><input type="checkbox"/></td> </tr> <tr> <td>1st Oct</td> <td>31st Jan</td> <td>Tillage Land</td> <td>All Other Soils</td> <td><input type="checkbox"/></td> </tr> <tr> <td>15th Oct</td> <td>31st Jan</td> <td>Grassland</td> <td>All Other Soils</td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p>*For Tillage Land with crops sown on or before 15th September</p> <p>If no, applications will be carried out as per CoGAP <i>i.e.</i> when ground conditions are suitable and when no heavy rain is forecast.</p>	Start Date	End Date	Land Use	Soil Type		1st Aug	31st Dec	Tillage Land	Shallow/Sandy	<input type="checkbox"/>	1st Sept	31st Dec	Grassland	Shallow/Sandy	<input type="checkbox"/>	16th Sept	31st Dec	Tillage Land*	Shallow/Sandy	<input type="checkbox"/>	1st Oct	31st Jan	Tillage Land	All Other Soils	<input type="checkbox"/>	15th Oct	31st Jan	Grassland	All Other Soils	<input type="checkbox"/>
Start Date	End Date	Land Use	Soil Type																												
1st Aug	31st Dec	Tillage Land	Shallow/Sandy	<input type="checkbox"/>																											
1st Sept	31st Dec	Grassland	Shallow/Sandy	<input type="checkbox"/>																											
16th Sept	31st Dec	Tillage Land*	Shallow/Sandy	<input type="checkbox"/>																											
1st Oct	31st Jan	Tillage Land	All Other Soils	<input type="checkbox"/>																											
15th Oct	31st Jan	Grassland	All Other Soils	<input type="checkbox"/>																											
<p><i>Will application rates comply with crop requirement and field/whole farm limit?</i></p>	<p>Yes, refer to table 6 – 8</p>																														
<p><i>Previous applications:</i></p>	<p>See online LPD1 form.</p>																														

6 Benefits and nutrients supplied to the soil or crop from this application

6.1 Receiving soils

The nutrient status of individual fields to be registered are provided in tables 6-8 above. General soil type(s) for the fields to be registered are:

Table 15. Soil type

Light sand soils	Soils which are sand, loamy sand or sandy loam to 40cm depth and are sand or loamy sand between 40 and 80 cm, or over sandstone rock.	<input type="checkbox"/>
Shallow soils	Soils over impermeable subsoils and those where the parent rock (chalk, limestone or other rock) is within 40cm of the soil surface. Sandy soils developed over sandstone rock should be regarded as light sand soils.	<input type="checkbox"/>
Medium soils	Mostly medium-textured mineral soils that do not fall into any other soil category. This includes sandy loams over clay, deep loams, and silty or clayey topsoils that have sandy or loamy subsoils.	<input checked="" type="checkbox"/>
Deep clayey soils	Soils with predominantly sandy clay loam, silty clay loam, clay loam, sandy clay, silty clay or clay topsoil overlying clay subsoil to more than 40cm depth. Deep clayey soils normally need artificial field drainage.	<input type="checkbox"/>
Deep silty soils	Soils of sandy silt loam, silt loam or silty clay loam textures to 100 cm depth or more. Silt soils formed on marine alluvium, warp soils (river alluvium) and brickearth soils are in this category. Silty clays of low fertility should be regarded as other mineral soils.	<input type="checkbox"/>
Organic soils	Soils that are predominantly mineral but with between 10 and 20% organic matter to depth. These can be distinguished by darker colouring that stains the fingers black or grey.	<input type="checkbox"/>
Peat soils	Soils that contain more than 20% organic matter derived from sedge or similar peat material.	<input type="checkbox"/>

The soil analyses (Soil Analysis) shows the soils to have low to acceptable background concentrations of Mg (i.e. ADAS Index of 1-2). The additions of magnesium supplied by the wastes will aid in maintaining the Mg indices, crucial for grazed swards to prevent hypomagnesaemia in livestock.

6.2 Waste characterisation

Full characterisations of individual wastes with total and available nutrients at the recommended rates for each waste stream are supplied in **Waste Analysis**. This information is further summarised against the nutrient requirements for proposed crops in tables 6-8 above.

Limiting factors for the different wastes are as follows:

- Total max N application rate (250kg/ha): DCWW Alwen
- Phosphorous: DCWW Alwen, DCWW Glascoed, DCWW Alaw
- Arsenic: DCWW Glascoed
- Soil pH: DCWW Alaw

Important information

- DCWW report all their analysis on a dry matter basis, including the liquid treatment sludges, unless otherwise stated.

- The moisture content at time of analysis is indicative of whether the sludge is a cake or a liquid. Typically, the sludge cake samples contain a significantly higher dry matter content than the liquid
- DCWW Alwen - The reservoir has high colour and organics content which is an exception in these regards. In recent years DCWW have been required by the DWI and evolving water quality standards to minimise the amount of these organics passing through into the final water so they only have a few parts per million at the most of organic carbon in the final water. This is achieved by adding ferric sulphate to the raw water (already at low pH) which reduces the pH further and then is increased straight away with lime. At pH 4.8 DCWW achieves optimum organics removal and flocculation. The flocks which create the sludge are therefore at this low pH unfortunately. If the pH is increased, more ferric is needed and the organics removal is not as good

6.3 Summary of benefits

These wastes are a source of essential elements RAN, P, K, macronutrients Mg, Ca, S and provide trace amounts of micronutrients. Wastes are beneficially used to replace a proportion of the bagged mineral fertiliser used by farmers. The recommended application rates shown in Tables 6-8 are based on the crop requirement and soil analysis.

Additions of organic matter to soil will improve soil structural stability, biological activity, water and nutrient holding capacity, i.e., resistance to drought, and reduction of localised flooding, reduced leaching of nutrients, and improved workability in soil. Organic matter is a particularly good source of N and S, and organic acids that aid nutrient solubility and uptake, as well as enhancing microbial activity for enhanced nutrient cycling in soils.

7 Potential negative impacts to the soil or crop from this application

7.1 Potentially Toxic Elements (PTEs)

All the wastes contain traces of PTEs, however concentrations applied to the receiving soils are below maximum upper limits for heavy metal applications described in the Sludge (Use in Agriculture) Regulations 1989 (SI, 1989). Refer to interpretations in **Waste Analysis**.

7.2 Other waste characteristics

The pH levels in the wastes range from 4.8-6.9.

It is unlikely that soil pH will decrease following the application detailed here due to the buffering capacity of the receiving soils. The pH levels of the receiving soils are between 5.1-6, therefore it is unlikely that availability of any naturally occurring heavy metals present in these soils will become more available after application of these wastes.

The potable water treatment sludges contain varying amounts of Al and Fe due to the flocculation process in the water treatment. At low pH (<6.0), aluminium can potentially transform into the toxic Al³⁺ species, it is therefore necessary to avoid spreading Al flocculated wastes on fields with pH <6.0 as this can cause stunt root growth and induced phosphate deficiency in crops. Additionally, care will be taken to prevent the waste entering a watercourse because aluminium can harm aquatic life. This will be achieved through observing buffer zones as per the location plan and the SSRA. Also, watercourses will be checked before, during and following spreading.

Iron flocculated wastes also have potential disbenefits if applied to inappropriate soils. Spreading high Fe wastes onto soils with pH < 5.0 is not recommended. Spreading onto fields with soil pH between 5.0- 5.5 requires consideration and possible mitigation. Two fields (1 & 7) fall within the pH 5-5.5 range. Risk will be mitigated here with targeted split applications not exceeding 50t/ha in a 3 week period.

7.3 Operational factors

1. Wastes will be surface spread, applied using a manure spreader.
2. Potential compaction of receiving soil will be mitigated by suitable adjustment of tyres/tyre pressure to match soil conditions, direction of spreading and load to be spread.
3. Sampling methods will be consistent with those set out in the RB209, and the analysis for PTEs are consistent with the code of agricultural practice.
4. Wastes will be applied when ground and weather conditions are suitable, following CoGAP to avoid soil damage including wheel ruts, compaction, structural damage, erosion and run-off.

8 Practices to reduce the impacts of the operation on identified sensitive receptors

All sensitive receptors have been marked as no spread zones with sufficient buffering for the prevention of potential negative impacts. The wastes intended to be spread are low risk in terms of odour and being carried by wind.

Generic measures (in addition to permit requirements and following the EMS) to reduce potential negative impacts of the proposed spreading operation will be as follows:

1. Spreading will only be undertaken when weather conditions are suitable within restrictions outlined in CoGAP and any relevant closed periods.
2. Spreading will not be carried out in any areas of a field that will be sub-soiled.
3. Machinery operations will take account of soil conditions, slopes *etc.*
4. Spreading machinery will be turned off prior to turning at the end of each run.
5. Machinery will be checked daily when in use, regularly serviced and spreading equipment calibrated. Umbilical hoses will be regularly checked for damage to prevent leaks.
6. Machinery turns will not be executed in the buffer strips.
7. Waste deliveries to field/stores will be supervised.
8. All spillages will be reported immediately to the EA.

9 Contingency planning

Replacement spreading machinery will be available to prevent waste being retained in faulty machinery. Hire vehicles will be used if required. All machinery will be fully serviced.

There will be a sufficient number of trained staff available to ensure that the operation continues throughout operational hours (*i.e.* there will be sufficient cover for illness, holiday *etc.*).

In adverse weather, storage is available until ground/weather conditions become favourable for land application.

In circumstances where the wastes cannot be stored or spread beyond normal capacities, wastes will be diverted to a local alternative deployment or DCWW sewage treatment works.