

Agricultural Benefit Statement

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1. Permit Details and Appropriate Technical Expertise

This agricultural benefit statement has been prepared by Ryan Griffiths-Patel of Trade Effluent Services Ltd.

Relevant Qualifications & Experience

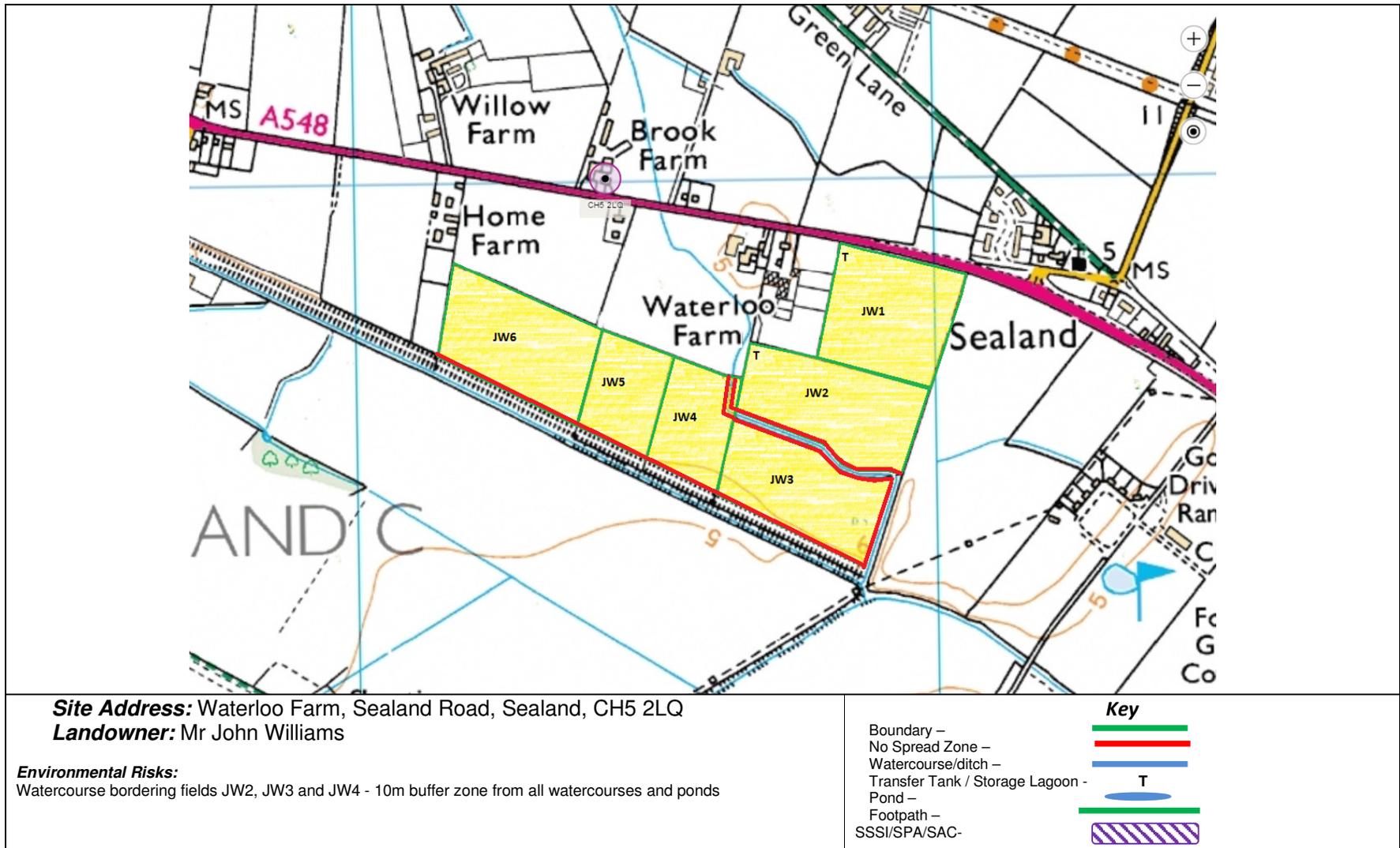
Msc Environmental Informatics
 Bsc Geography
 1 Year's experience in deployment applications

2. Land Details

The following benefit statement proposes to spread up to 1 waste to land. The land details are listed in Table 1, and the site map can be found in Figure 1. This benefit statement is two of two benefit statements for the land.

Table 1: Farm and Land Details

Farm Name	Waterloo Farm
Farm Address and Postcode	Sealand Road, Sealand, CH5 2LQ
Farm NGR	SJ 34653 68880
Total Area to be Spread (hectares)	40.5



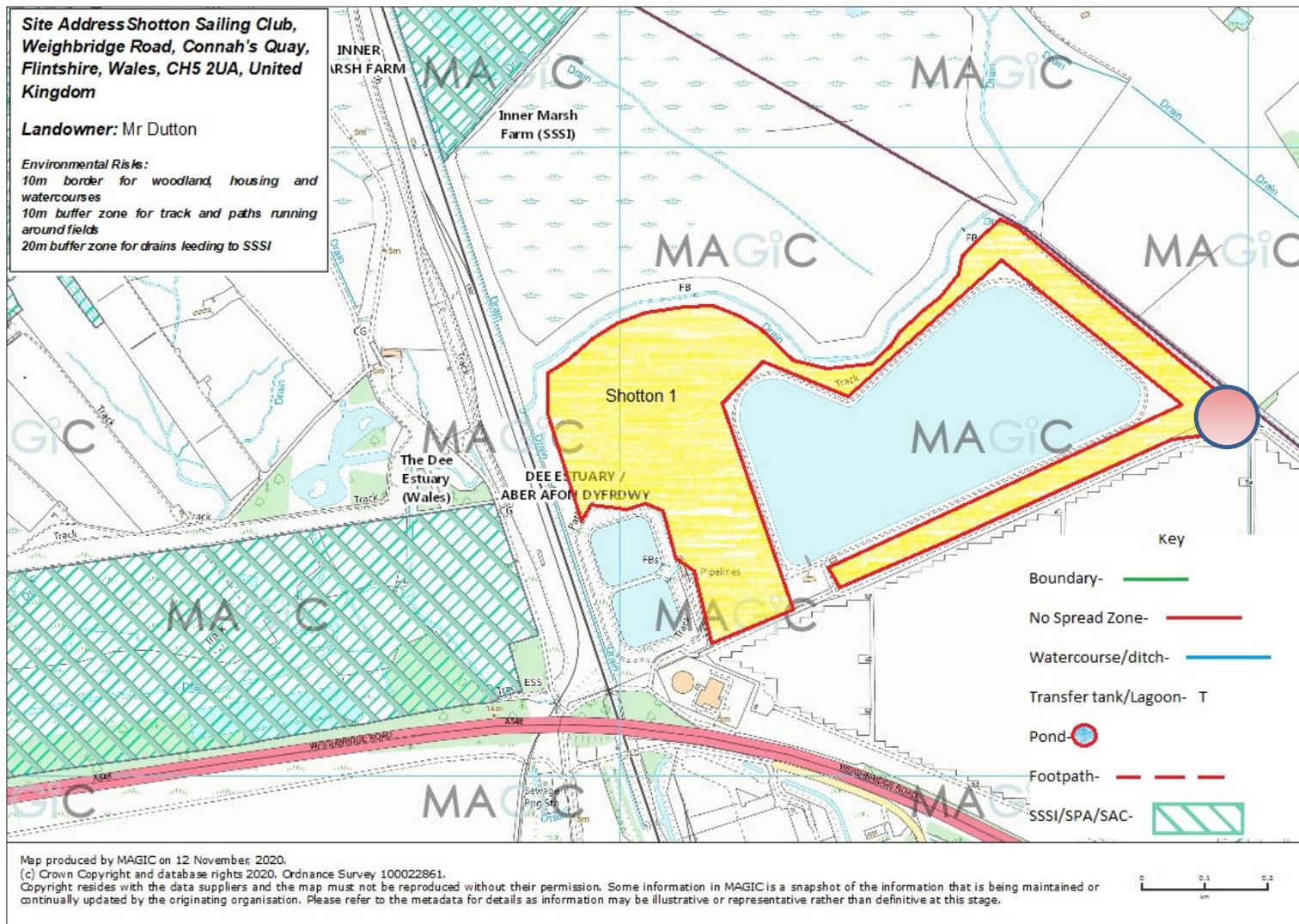


Figure 1: Site map including the fields to spread, receptors, storage (T), and spreading control measures

3. Waste Details

A summary of the waste description and EWC code is show in Table 2.

Waste Producer	EWC Code	Waste Description	Total Amount being spread(Tonnes)
Ahlstrom	03 03 11	Black Liquor produced as a by product of cellulose fibre extraction	469
Total Hectares	40.5		

Table 2: Waste Details

- The liquor has been analysed by NRM Ltd for major plant nutrients, including nitrogen, phosphate and potash and will provide agricultural benefit through the addition of these nutrients to receiving soil.
- A copy of the analysis and waste evaluation for the liquor is included as an appendix to this document.
- Waste will be delivered to the site by road tanker and off loaded. The black liquor will be surface applied by umbilical supplied tractor mounted spreader bar to reduce travelling weight and risk of compaction across fields.
- It is intended to spread the wastes to arable fields before seedbed preparation. For this application, the wastes are expected to be applied to all fields in January/February 2021. However, this may change due to farmer requirements and weather conditions.
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4. Fields and Crop Requirement

The sludges will be applied to all fields and so the crop requirements for all fields, as well as the field sizes and grid references, are displayed in Table 3. Fertiliser requirements are based on figures from the RB209 (9th edition). The magnesium recommendation for all fields is 0 kg/ha.

Table 3: Field Details and Crop Requirements (* denotes crop offtake)

Field	Size (ha)	Grid Reference	Soil Type	Current Crop	Next Crop	Expected Yield (t/ha)	Nitrogen kg/ha	Phosphate kg/ha	Potash kg/ha
JW1	4.5	SJ 34920 68770	Clay Loam	Maize	Maize	40	100	85	235
JW2	4.8	SJ 34820 68600	Clay Loam	Maize	Maize	40	100	Offtake (56)	145
JW3	4.8	SJ 34770 68440	Clay Loam	Maize	Maize	40	100	85	205
JW4	2.7	SJ 34580 68570	Clay Loam	Maize	Maize	40	100	20 Offtake (56)	205
JW5	2.5	SJ 34460 68620	Clay Loam	Maize	Maize	40	100	20 Offtake (56)	235
JW6	5.2	SJ 34270 68700	Clay Loam	Maize	Maize	40	100	Offtake (56)	110
Shotton 1	16	SJ 31187 72385	Clay Loam	Maize	Maize	40	100	Offtake (56)	175

The soil nitrogen supply (SNS) for fields JW1 – JW6 is 1.

5. NVZ Compliance

The site falls outside an NVZ designated area, which is illustrated in Figure 2. The wastes do not apply for the closed periods as they contain low percentages of available nitrogen. The application rates of the wastes will comply with crop requirement as no more than crop offtake of all nutrients will be applied to fields. In order to aid the landowner or farmer with their recording requirements, a post-notification of nutrients applied will be provided after spreading.



Figure 2: NVZ map for the land to be spread produced from the ‘What’s in my backyard’ mapping service on the EA website (www.environment-agency.gov.uk).

Application rates are limited to a maximum of 250 kg total N/ha, and any other organic waste or manure applications have been accounted for. Previous nutrients applied to the fields within the last 12 months are listed in Table 4. The nutrients in Table 4 are total applied, and the availability of each can be taken from the standard figures in the RB209 (9th edition, section 2). As this is two of two deployments for the land, the total nutrients applied to the crops will be carefully monitored so that no more than crop offtake of all nutrients will be applied to fields.

Table 4: Previous Nutrients Applied

Field	Waste Applied	Month Applied	Application Rate	Nitrogen	Phosphate	Potash
			t/ha	kg/ha	kg/ha	kg/ha
JW1	Commercial	Jan 20	100	123	56	38

	Waste					
JW2	Commercial Waste	Jan 20	100	123	56	38
JW3	Commercial Waste	Jan 20	100	123	56	38
JW4	Commercial Waste	Jan 20	100	123	56	38
JW5	Commercial Waste	Jan 20	100	123	56	38
JW6	Commercial Waste	Jan 20	100	123	56	38

6. Benefits of The Operation

The wastes will be used to provide plant nutrients that will replace a percentage of the fertiliser that the farmer would normally apply to their crop. The wastes will also provide benefit through the addition of organic matter and trace elements. The applied nutrients provided by the wastes may be subject to change: determined by analysis of individual samples during the agreed 12 month deployment period. The sludge is regularly analysed and application rates will be adjusted according to changes in analysis and volumes arising.

A summary of the wastes and the proposed application rates are listed in Table 5.

Table 5: Summary of Waste Nutrients and Application Rate

Waste Name	Application Rate t/ha	pH	Nitrogen kg/ha		Phosphorous kg/ha		Potassium kg/ha		Magnesium kg/ha
			Total	Available (35%)	Total	Available (50%)	Total	Available (90%)	Total
Ahlstrom	10	8.9	4	2	0.5	0.25	39	35	0
Ahlstrom	14	8.9	6	2	1	0.5	55	49	0

Wastes will be applied on an individual basis and applications, which are established for each waste when applied in isolation, will be carefully managed and monitored to ensure that nutrients are applied at or below crop requirement/offtake values. It may however be necessary to apply the wastes as a mix such as during storage during adverse weather. In this case, the waste with the highest nutrient, PTE or other limiting factor is used as the maximum application rate, and thus wastes will be applied at the lowest individual application rate. Application rates will be adjusted by variation in tractor speed and or pump speed. It should be noted that if application rates are adjusted, they will not be increased above the application rates stated in this benefit statement (see Table 5). As this is 2 of 2 deployments for the land, the wastes across both will be carefully monitored and applications rates will be adjusted accordingly, as outlined above.

Nitrogen

The waste analysis shows that the ammoniacal and nitrate nitrogen in the majority of wastes is relatively low; indicating that only a small proportion of nitrogen will be available immediately. The remaining total nitrogen applied will become available to the crop through mineralisation throughout following seasons. The rate of nitrogen release will be affected by several factors including climate, timing and method of application, and soil type.

Phosphorus

Applications of wastes are limited to ensure that phosphate is applied at or below crop off take values, as calculated from the RB209, ensuring that the spreading activities do not increase soil P reserves.

Potash

The wastes applied will supply up to 102kg/ha of potash, which will not meet crop offtake for all fields, but it will allow the landowner/farmer to considerably reduce the amount of chemical fertiliser required to meet the crop need. Applications of wastes are limited to ensure that potash is applied at or below crop off take values, as calculated from the RB209, ensuring that the spreading activities do not increase soil reserves.

Organic Matter

The wastes will also provide a small increase in soil organic matter. This can help to improve soil structure and water, and nutrient holding capacity.

Sulphur

- With the soils being clay loam at Waterloo Farm, the sulphur will be less likely to leach as it will be bound to the organic matter in the soil.
- The risk of leaching from an application of Ahlstrom is relatively small as the majority of the sulphur present is in the form of lignosulphates, which will be organically bound to the soil. These stable compounds have been used as soil conditioners as they promote soil aggregation.
- The levels of sulphur will be monitored over the coming season to ensure that a continued build-up of sulphur will not have a detrimental impact on the environment, and total sulphur and conductivity will be analysed after spreading.
- The fields are relatively flat and at 26t/ha a total of 642kg of sulphur will have been applied per field. This is higher than required however it is expected that due to the higher amounts of rainfall that occurred in the winter the fields will need a increased amount of sulphur.

Soils

Additionally, full soil analysis of the proposed fields to be spread has been attached in Appendix C, and a summary table has been included in Table 6.

Table 6: Summary of soil pH and major nutrients for the fields to be spread

Field	Soil pH	Phosphate		Potash		Magnesium		SNS
	pH	mg/l	Index	mg/l	Index	mg/l	Index	Index
JW1	6.8	9.6	1	49.2	0	39.2	1	1
JW2	7.3	61.2	4	204	2+	107	3	1
JW3	6.4	12	1	63.5	1	70.2	2	1
JW4	6	27.6	3	72.5	1	76.6	2	1
JW5	6.9	33	3	56.8	0	59	2	1
JW6	6.7	62.6	4	395	3	109	3	1
Shotton 1	7.9	81	5	144	2-	33.2	1	1

The soils were sampled in October 2018 and August 2020 in accordance with the sampling procedures described in the RB209 (9th Edition). Analysis was carried out by NRM laboratories for pH, major plant nutrients, and potentially toxic elements (PTEs) described in the Sludge (Use in Agriculture) Regulations.

Soils were found to be loamy categorised in accordance with RB209 (9th edition) as mineral soils for crop recommendations.

Soil pH ranges from 6.0 and 7.9, and are above the target value, although it shouldn't affect crop performance. Soil P index's range from 1 to 5, with several of the soils above the guideline target index of 2. Soil K levels ranged from index 0 to 3 and are generally around the target index level of 2-. The magnesium index for all fields was satisfactory. PTE concentrations for the majority of fields is low and within the typical range of uncontaminated soil.

7. Potential Negative Impacts

There are no known or expected elevated levels of PTEs within the waste.

Site Hazards

Hazards have been identified on the site plan in Figure 1, and relevant control measures and buffer zones have been identified. Operations are to be carried out in accordance with the company generic risk assessment for landspreading, which will reduce the impacts of the operation on the receiving soil.

8. Sensitive Receptors

There are a number of properties within 500m of the fields proposed to be spread. Odour and noise will be controlled, as detailed in section 8, in order to minimise the disruption caused to residents.

There are no footpaths or tracks crossing the fields to be spread, and no boreholes, wells or springs have been identified within the spreading area.

There are two SSSI within 500m of the spreading site. The two SSSI are called Inner Marsh Farm and Dee Estuary. These have been addressed in the attached risk assessment. Also drains that are leading into these SSSIs have a larger 20m buffer zone. This is to ensure we do not contaminate the SSSI through runoff.

The site is within a flood prone area and the land is outside a ground water protection zone (Figure 3). The wastes will be spread in appropriate conditions with weather and field conditions continuously examined.



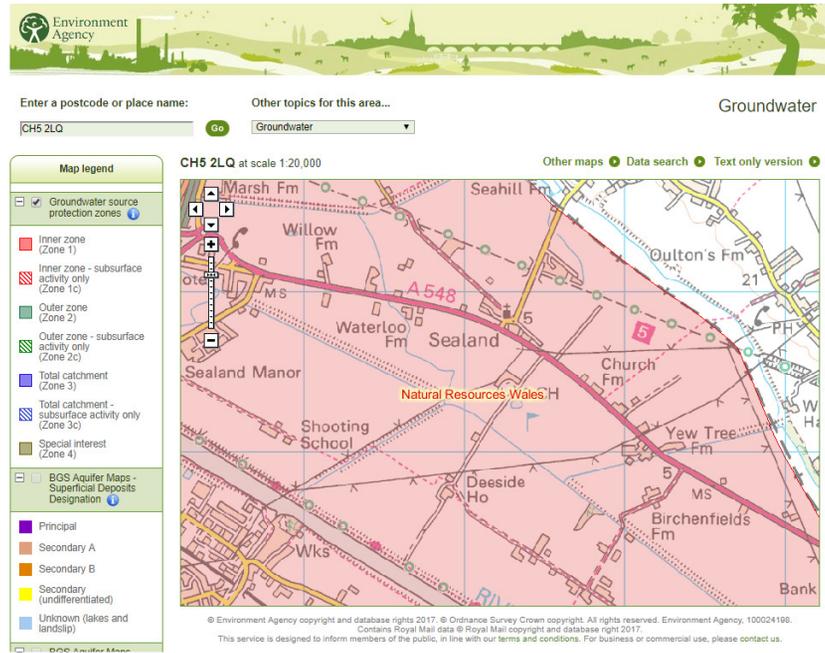


Figure 3: Maps of flood prone areas and ground water protection zones of the land to be spread. These were obtained from the NRW website (naturalresources.wales/evidence-and-data/maps/long-term-flood-risk) and ‘What’s in my backyard’ (www.environment-agency.gov.uk) respectively.

9. Contingency Planning

To cover machinery breakdown, replacement machinery is available or can be hired from suppliers and mobile mechanics are available to attend sites. All machinery is regularly serviced.

There is sufficient trained staff to maintain sickness and holiday cover.

Spreading operations will not be carried out when there are adverse weather conditions that are likely to interfere with the operation. These conditions include; heavy rain, or during periods of heavy snow or frozen ground as defined in the Code of Good Agricultural Practice (COGAP).