

Agricultural Benefit Statement

1. Appropriate Technical Expertise

- This agricultural benefit statement has been prepared by Ryan Griffiths-Patel of Trade Effluent Services
- Relevant Experience & Qualifications
 - o Land spreading of non-farm wastes course (2 day course – Feb 2021)
 - o BSc. (Hons) Geography
 - o MSc Environmental Informatics
 - o 2 Years experience of waste to land recycling operations

1. Land Details

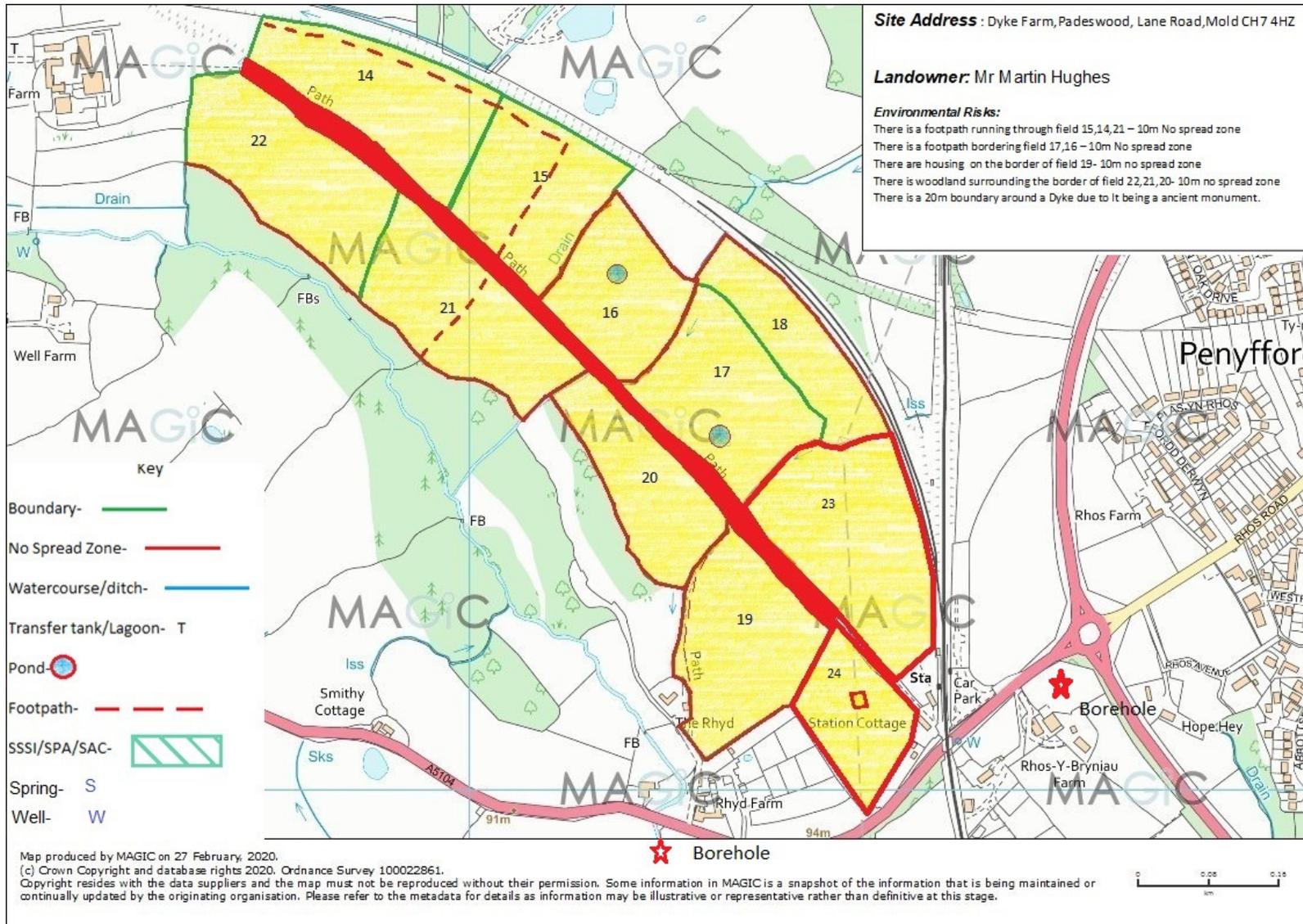
The following benefit statement proposes to spread up to 10 wastes to land. The land details are listed in Table 1, and the site map can be found in Figure 1. The land is located at Dyke Farm, Padeswood Lake Road, CH74HZ. The total spreading area is 48.2 hectares. The site has been historically farmed and over the past 5 years several deployments have been granted for these fields.

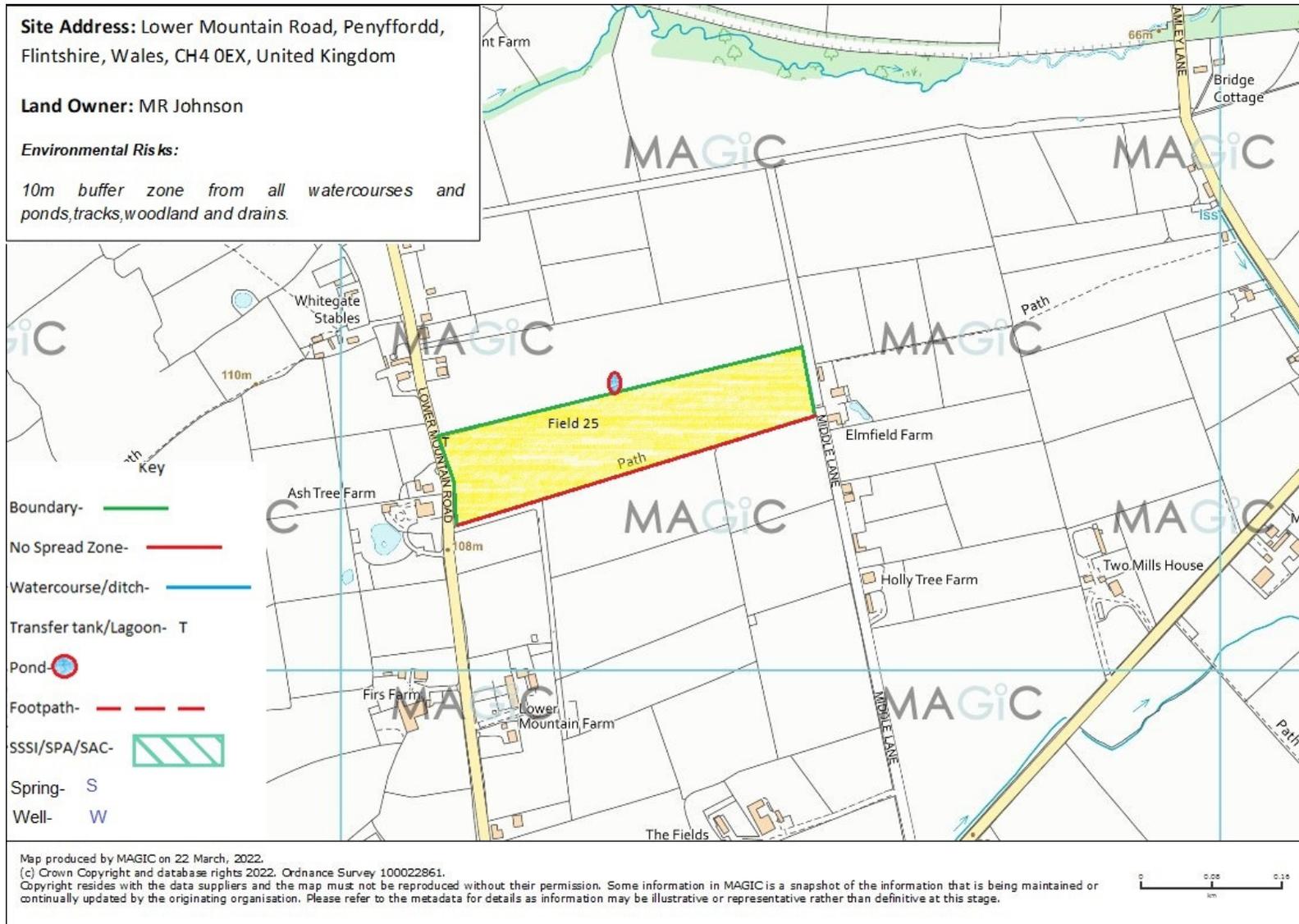
Table 1: Farm and Land Details

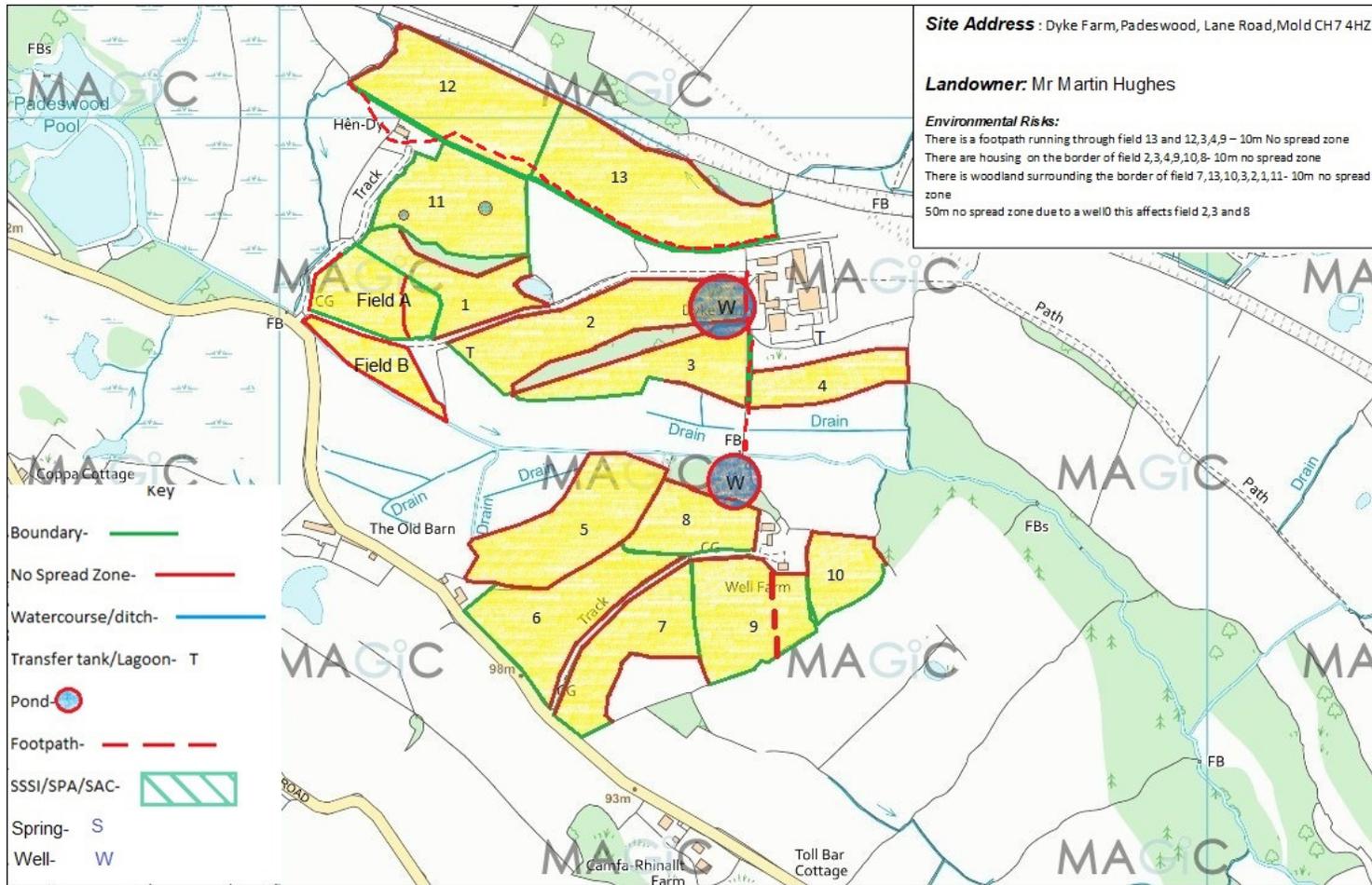
Field	Field Size (ha)	Grid Reference
1	1	SJ 28205 61804
2	1.9	SJ 28327 61770
3	1.1	SJ 28463 61732
4	0.7	SJ 28565 61716
5	1.6	SJ 28297 61542
6	1.5	SJ 28324 61464
7	1.2	SJ 28401 61451
8	0.8	SJ 28456 61560
9	1.3	SJ 28501 61446
10	0.6	SJ 28628 61507

11	1.5	SJ 28192 61908
12	1.9	SJ 28195 62021
13	2.1	SJ 28368 61931
14	3.2	SJ 28860 61803
15	2.7	SJ 29061 61709
16	2.2	SJ 29171 61540
17	2.9	SJ 29285 61486
18	1.8	SJ 29404 61489
19	3	SJ 29320 61148
20	2.3	SJ 29211 61321
21	3.2	SJ 28993 61538
22	3.2	SJ 28803 61693
23	3.6	SJ 29465 61234
24	1.6	SJ 29437 61070
Field A	0.9	SJ 28088 61807
Field B	0.6	SJ 28119 61733
Field 25 Penyfford	3.4	SJ 31291 60262

Up to 30m³ of waste will be stored in each mobile storage tank at the land to be spread, with no more than 120m³ in total being stored on site. This is suitable storage and the storage tank locations will be situated in appropriate locations. The storage locations are marked on the site map in Figure 1, which are at the following grid reference locations: SJ 28562 61795 and SJ 28213 61763 and SJ 31114 60264.







Map produced by MAGIC on 27 February, 2020.
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Figure 1a: Site map

including the fields to spread, receptors, storage (T), and spreading control measures

2. Waste Details

The wastes generally arise from food and beverage manufacturers and are primarily sludge from on-site effluent treatment plants, and materials unsuitable for consumption and processing. The waste details are displayed in Table 2.

Table 2: Waste Details All fields except fields 11-13 and 23,24

Waste Producer	EWC Code	EWC Code Description	Total Amount being spread (Tonnes)	Further Description
Secanim	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation plants only	8220	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.
Croda Goole (Forward Environmental)	07 07 12	Sludges from on-site biological effluent treatment plant at chemical manufacturing sites other than those mentioned in	1849.5	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. There is no need to test for FOGs due to the type of waste material.

		07 01 11 only		
Croda Widnes	02 03 05	Sludges from on-site ETP	1438.5	<p>The site in Widnes produces products by processing cereals, potato protein, soya, and rice. The EWC provided by Croda widnes is 02 03 05. This waste stream has been spread onto agricultural land over the past 5 years without any environmental impacts. Although the site has a permit number for radioactive waste, this occurs on a different part of the site. We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.</p>

Maelor Foods	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation plants only	1315.2	<p>We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.</p>
Encirc	02 07 05	Sludge from ETP	575.4	<p>We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis. There is no need to test for FOGs due to the type of waste material.</p>

Beechdean Ice cream	02 05 01	Biodegradable materials unsuitable for consumption or processing	10069.5	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.
PENDERYN DISTILLERY	02 07 05	sludges from on-site effluent treatment	6987	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for.
Kelloggs	02 03 05	Sludges from on-site ETP	4110	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis. There is no need to test for FOGs due to the type of waste material.

Rowan Foods	02 03 05	Sludges from on site ETP	10275	The waste stream is visually inspected prior to sending for analysis. This waste stream has been spread onto agricultural land over the past 5 years without any environmental impacts. We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.
D.Wise (Liquid)	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation plants only	904.2	This waste is not from a permitted site. We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps.
Total Spreadable Hectares	41.1	Total Tonnage	10275	
Table 2 waste description				

Waste Producer	EWC Code	EWC Code Description	Total Amount being spread (Tonnes)	Further Description
Secanim	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation plants only	1765.5	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.
Croda Goole (Forward Environmental)	07 07 12	Sludges from on-site biological effluent treatment plant at chemical manufacturing sites other than those mentioned in 07 01 11 only	395.9	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. There is no need to test for FOGs due to the type of waste material.

Croda Widnes	02 03 05	Sludges from on-site ETP	299.6	<p>The site in Widnes produces products by processing cereals, potato protein, soya, and rice. The EWC provided by Croda widnes is 02 03 05. This waste stream has been spread onto agricultural land over the past 5 years without any environmental impacts. Although the site has a permit number for radioactive waste, this occurs on a different part of the site. We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.</p>
Maelor Foods	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation plants only	278.2	<p>We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.</p>

Encirc	02 07 05	Sludge from ETP	128.4	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis. There is no need to test for FOGs due to the type of waste material.
Beechdean Ice cream	02 05 01	Biodegradable materials unsuitable for consumption or processing	2140	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.
PENDERYN DISTILLERY	02 07 05	sludges from on-site effluent treatment	1498	We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for.

Kelloggs	02 03 05	Sludges from on-site ETP	856	<p>We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis. There is no need to test for FOGs due to the type of waste material.</p>
Rowan Foods	02 03 05	Sludges from on site ETP	2675	<p>The waste stream is visually inspected prior to sending for analysis. This waste stream has been spread onto agricultural land over the past 5 years without any environmental impacts. We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps. Secondary PTEs-The waste producers all come from food producers or edible oils manufacturers. We do not anticipate any sort of concentrations of selenium, arsenic, molybdenum and Fluoride and so they have not been tested for. Each of these waste streams have been registered and spread multiple times in the past 5 years without any issues or need to test for the mentioned analysis.</p>
D.Wise (Liquid)	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation	192.6	<p>This waste is not from a permitted site. We do not anticipate any sort of soil borne diseases to occur due to the processing methods used by each waste producer. BODs- Where there is potential in certain to have a high BOD we will mitigate by spreading at correct times of the year. We anticipate that the main problem will be around ditch/watercourses. Our mitigation measures are focussed upon buffer zones which are clearly highlighted on our maps.</p>

		plants only		
Total Spreadable Hectares	10.7	Total Tonnage	2675	
Table 2 waste description fields 11-13 23,24				

The wastes have been analysed by NRM laboratories for nitrogen, phosphorous, potash and PTE’s, and individual waste analyses are attached in Appendix D. FOGs analysis has been attached however we do not expect there to be any in the waste as it the waste is not expected to contain Selenium, Arsenic, Molybdenum and Fluoride. The wastes will be closely monitored during the spreading of this site,

To avoid the need for multiple deployments when a range of wastes are available, it is necessary to include them all to accommodate such variables as the amount of material produced by the waste producer and the timing of application (before seedbed preparation).

3. Operational Details

The wastes will be delivered to the site by road tanker and off-loaded into the mobile storage tanks. It is intended to spread the wastes by sub-soil injection to reduce the risk of environmental incidents, such as run-off and odour issues; to minimise disbenefit to the growing crop, such as through smothering or leaf scorch; and to provide nutrients to the root zone. Typically, wastes will be applied by deep-leg injector.

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 spring barley fields in March/April 2022 and other arable fields in autumn 2022 and to the grass fields in between March and August 2022. However, this may change due to farmer requirements and weather conditions. If the deployment is not completed then in 2023 in march/April the wastes will be spread on the spring barley.

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	Field Size (ha)	Grid Reference	Soil Type	Current Crop	Next Crop	Expected Yield (t/ha)	Nitrogen kg/ha	Phosphate kg/ha	Potash kg/ha
1	1	SJ 28205 61804	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	95	170
2	1.9	SJ 28327 61770	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	20 Offtake(64.6)	Offtake 228
3	1.1	SJ 28463 61732	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	310
4	0.7	SJ 28565 61716	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	260
5	1.6	SJ 28297 61542	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	20 Offtake(64.6)	170
6	1.5	SJ 28324 61464	Clay Loam	Spring Barley (Straw Removed)	Maize	40	100	55	205
7	1.2	SJ 28401 61451	Clay Loam	Spring Barley (Straw Removed)	Maize	40	100	55	235
8	0.8	SJ 28456 61560	Clay Loam	Spring Barley (Straw Removed)	Maize	40	100	20 Offtake (56)	235
9	1.3	SJ 28501 61446	Clay Loam	Spring Barley (Straw Removed)	Maize	40	100	20 Offtake (56)	235
10	0.6	SJ 28628 61507	Clay	Spring Barley	Maize	40	100	55	235

			Loam	(Straw Removed)					
11	1.5	SJ 28192 61908	Clay Loam	Spring Barley (Straw Removed)	Spring Barley (Straw Removed)	5.5	140	45	125
12	1.9	SJ 28195 62021	Clay Loam	Spring Barley (Straw Removed)	Spring Barley (Straw Removed)	5.5	140	45	125
13	2.1	SJ 28368 61931	Clay Loam	Spring Barley (Straw Removed)	Spring Barley (Straw Removed)	5.5	140	45	995
14	3.2	SJ 28860 61803	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	95	260
15	2.7	SJ 29061 61709	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	260
16	2.2	SJ 29171 61540	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	260
17	2.9	SJ 29285 61486	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	260
18	1.8	SJ 29404 61489	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	310
19	3	SJ 29320 61148	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	260
20	2.3	SJ 29211 61321	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	260
21	3.2	SJ 28993 61538	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	310
22	3.2	SJ 28803 61693	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	125	310
23	3.6	SJ 29465 61234	Clay Loam	Spring Barley (Straw Removed)	Spring Barley (Straw Removed)	5.5	140	45	65

24	1.6	SJ 29437 61070	Clay Loam	Spring Barley (Straw Removed)	Spring Barley (Straw Removed)	5.5	140	45	995
Field A	0.9	SJ 28088 61807	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	95	310
Field B	0.6	SJ 28119 61733	Clay Loam	2nd cut silage and grazing	2nd cut silage and grazing	38	210	95	310
Field 25 Penyfford	3.4	SJ 31291 60262	Clay Loam	Maize	Maize	40	100	20 Offtake (56)	205

The soil nitrogen supply (SNS) for all arable fields is 1 for all grass fields it is moderate. The SNS index for all other fields 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.

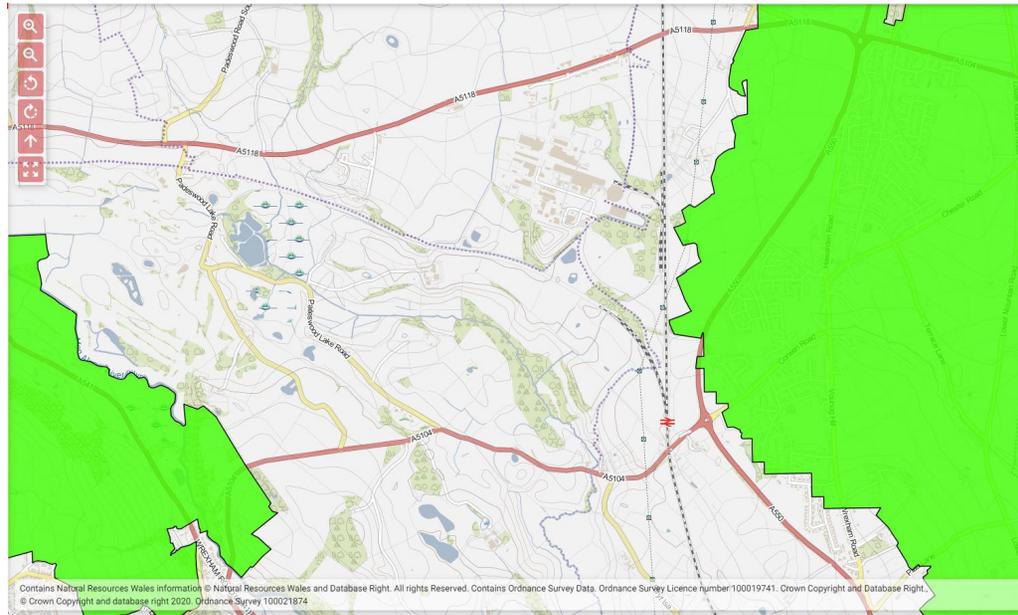


Figure 2: NVZ map for the land to be spread produced from the mapping service on the NRW website (<https://lle.gov.wales/catalogue/item/NitrateVulnerableZonesNVZ/?lang=en>).

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).

Table 4: Previous Nutrients Applied

All fields apart from 9,10,Field A, Field B,23 and 24 have been spread with commercial waste. The rest of the fields were spread in May 2021. 9,10,Field A and Field B,23,24 have been spread with FYM in 2021.

Field	Waste Applied	Application Rate (t/ha)	Nitrogen		Phosphate		Potash	
			Total	Available	Total	Available	Total	Available
1	Commercial Waste	100	123	36.9	62	31	79	71.5
2	Commercial Waste	100	123	36.9	62	31	79	71.5
3	Commercial Waste	100	123	36.9	62	31	79	71.5
4	Commercial Waste	100	123	36.9	62	31	79	71.5
5	Commercial Waste	100	123	36.9	62	31	79	71.5
6	Commercial Waste	100	123	36.9	62	31	79	71.5
7	Commercial Waste	100	123	36.9	62	31	79	71.5
8	Commercial Waste	100	123	36.9	62	31	79	71.5
9	FYM	3	6	2	9.6	5.7	28.2	25.5
10	FYM	3	6	2	9.6	5.7	28.2	25.5
11	Commercial Waste	100	123	36.9	62	31	79	71.5
12	Commercial Waste	100	123	36.9	62	31	79	71.5
13	Commercial Waste	100	123	36.9	62	31	79	71.5
14	Commercial Waste	100	123	36.9	62	31	79	71.5
15	Commercial Waste	100	123	36.9	62	31	79	71.5
16	Commercial Waste	100	123	36.9	62	31	79	71.5
15	Commercial Waste	100	123	36.9	62	31	79	71.5
16	Commercial Waste	100	123	36.9	62	31	79	71.5
17	Commercial Waste	100	123	36.9	62	31	79	71.5

Appendix A – Agricultural Benefit Statement

3169 – Dyke Farm

18	Commercial Waste	100	123	36.9	62	31	79	71.5
19	Commercial Waste	100	123	36.9	62	31	79	71.5
20	Commercial Waste	100	123	36.9	62	31	79	71.5
21	Commercial Waste	100	123	36.9	62	31	79	71.5
22	Commercial Waste	100	123	36.9	62	31	79	71.5
23	FYM	3	6	2	9.6	5.7	28.2	25.5
24	FYM	3	6	2	9.6	5.7	28.2	25.5
Field A	FYM	3	6	2	9.6	5.7	28.2	25.5
Field B	FYM	3	6	2	9.6	5.7	28.2	25.5

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 all fields except 11-13 and 23,24

Commercial Waste	Application Rate t/ha	pH	Nitrogen kg/ha		Phosphorous kg/ha		Potassium kg/ha		Magnesium kg/ha
			Total	Available	Total	Available (50%)	Total	Available (90%)	Total
Secanim	200	7.45	140	4	55	27	43	39	8
Croda Goole (Forward Environmental)	45	7.01	99	1	54	27	12	10	7
Croda Widnes	35	7.04	126	21	55	27	12	10	12
Maelor Foods	32	7.05	118	33	54	27	7	6	12
Encirc	14	6.96	100	8	52	26	11	10	5
Beechdean Ice cream	245	3.76	147	15	55	28	50	45	10
PENDERYN DISTILLERY	170	5.33	68	41	55	27	58	52	10
Kelloggs	100	3.94	190	2	55	28	18	17	5
Rowan Foods	250	4.17	75	23	35	18	23	20	10
D.Wise (Liquid)	22	7.66	238	7	55	27	20	18	102

Fields 11-13 23,24

Commercial Waste	Application Rate t/ha	pH	Nitrogen kg/ha		Phosphorous kg/ha		Potassium kg/ha		Magnesium kg/ha
			Total	Available	Total	Available (50%)	Total	Available (90%)	Total
Secanim	165	7.45	116	3	45	23	35	32	6
Croda Goole (Forward Environmental)	37	7.01	81	1	45	22	10	9	6
Croda Widnes	28	7.04	101	17	44	22	9	8	10

Maelor Foods	26	7.05	96	27	44	22	5	5	10
Encirc	12	6.96	86	7	45	22	9	8	5
Beechdean Ice cream	200	3.76	120	12	45	23	41	37	8
PENDERYN DISTILLERY	140	5.33	56	34	45	22	48	43	8
Kelloggs	80	3.94	152	2	44	22	15	13	4
Rowan Foods	250	4.17	75	23	35	18	23	20	10
D.Wise (Liquid)	18	7.66	195	6	45	22	16	14	83

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). On all grass fields there will be a break after spreading before grazing can occur.

Nitrogen

The waste analysis shows that the ammonia 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. For all fields the risk of leaching is low as according to the RB209 it only becomes a risk at index level 5 and above. Furthermore the risk of P leaching will be mitigated through appropriate application from timing and placement.

Potash

The wastes applied will supply up to 61kg/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.

pH

Kelloggs (3.94) and Rowan (4.17) which is slightly acidic, the receiving soil have pH ranging from 5.4 to 7.4 and will buffer the waste pH with not detrimental effect anticipated. The soils at Dyke Farm are classified on soil scapes as medium Loamy and clayey soils. These soil types are at a much lower of risk to the effect of pH than other soils such as Non-calcareous sandy soils. Soil scapes states that the soils are naturally

slowly draining slightly acidic soils but base rich soils so the soil pH is naturally acidic. All other waste streams the soil pH will buffer the waste. All these wastes have been spread across Wales (Pan-007288, Pan-007287, Pan-006671, Pan-006314, Pan-007722, Pan-007721) and England on similar soils types, pH and application rates and have not seen any detrimental effects.

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
1	6.5	15.2	1	158	2-	114	3	Moderate
2	7.4	28	3	301	3	109	3	Moderate
3	6.2	8.2	0	64.8	1	80.2	2	Moderate

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4	5.8	9.4	0	37.8	0	103	3	Moderate
5	5.6	26	3	151	2-	83.6	2	Moderate
6	6.4	18.6	2	77.3	1	56.7	2	1
7	5.9	22.8	2	26.6	0	36.3	1	1
8	6.4	26.8	3	31	0	59.5	2	1
9	6.1	35.2	3	56.4	0	55	2	1
10	6.1	24.6	2	52.3	0	60.9	2	1
11	5.6	17.8	2	22.5	0	63	2	1
12	5.8	15.6	2	47.2	0	80.7	2	1
13	6.3	24.2	2	74.1	1	110	3	1
14	6.3	12.6	1	54.8	0	88.3	2	Moderate
15	6	6.6	0	42.7	0	104	3	Moderate
16	6	6	0	41.1	0	84.3	2	Moderate
17	6.4	6.4	0	26.6	0	96.8	2	Moderate
18	6.2	8.8	0	65.7	1	73.2	2	Moderate
19	6.1	7.6	0	31.8	0	62.8	2	Moderate
20	5.6	7.8	0	55.6	0	55.4	2	Moderate
21	6	9.4	0	74.9	1	128	3	Moderate
22	5.4	8.6	0	62.8	1	105	3	Moderate
23	6.3	22.8	2	139	2-	61	2	1
24	5.9	20.8	2	111	1	68	2	1
Field A	6.1	12.4	1	86.6	1	82	2	Moderate
Field B	5.8	11.4	1	87	1	84.6	2	Moderate
Field 25 Penyfford	6.7	31.6	3	69.3	1	67.7	2	1

The soils were sampled in February 2020 and February 2021 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 and clayey categorised in accordance with RB209 (9th edition) as mineral soils for crop recommendations.

Soil pH ranges from 5.4 and 7.4, and are above the target value, although it shouldn't affect crop performance. Soil P index's range from 0 to 3, with several of the soils below 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.

Zinc

Zinc levels for all the fields a relatively high, at the proposed application rates in the deployment application trace amounts of zinc are applied to the fields. The soils pH levels are around target levels. Although some of the wastes are slightly acidic the soil pH will buffer the application of these wastes, and after discussions with the farmer he has agreed to a liming application where the slightly acidic wastes are applied.

7. Potential Negative Impacts

There are no known or expected elevated levels of PTEs within the wastes. However, some wastes do contain low pH, although it shouldn't affect crop performance.

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.

Odour and Noise Control

The wastes have the potential to cause odour, however storage will be sited away from dwellings, and it is unlikely to cause nuisance odour issues. Additionally, application of sludge via an umbilical cord sub soil injection system will minimise the risk of odour. The operation will be carried out in accordance within normal agricultural hours to minimise the risk of odour and noise complaints.

Storage Tanks

Storage tanks are inspected daily by the operator and wherever possible left empty at the end of the working day. Storage tanks will not be sited within 10m of watercourses or at the top of a steep embankment. Signage on the tanks identifies the company and activity, and has emergency contact details. Anticipated location of storage tanks are shown in Figure 1, but locations may vary slightly due to unforeseen operational requirements.

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 footpaths or tracks crossing the fields to be spread, and no boreholes or springs have been identified within the spreading area. For the footpaths in the fields a 10m no spread zone has been implemented and they have been marked on the site maps. There is a well in fields 2,3, and 8. A 50m no spread zone has been placed around this. There is also a dyke running through several fields. This has had a 20m no spread zone.

There are two ground water abstraction zones located at SJ 29410 60921 and SJ 2973 6109. They are further than 50m from the site.

The site is not within a flood prone area and the land is outside a ground water protection zone. The wastes will be spread in appropriate conditions with weather and field conditions continuously examined.

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).