Document 1: Landspreading Deployment Benefit Statement

Proposed application of waste water from the processing of used cooking oil and fat on fields at Palmer & Klein Ltd, Ongar Hall Farm, Brentwood Road, Orsett, Essex, RM16 3HU

1 Qualifications and Technical Expertise

This document has been produced by:

- Mel Holloway, MJH Consultancy, Agricultural Consultant
- 19 years working for ADAS and 4.5 years working independently, as an Agricultural Consultant providing crop nutrition, fertiliser and waste management (farm and non-farm) advice and consultancy. Experience includes waste to land applications, nutrient, manure and soil management plans and advice for compliance with Nitrate Vulnerable Zone, Farming Rules for Water and SSAFO rules. She has research and development experience with fertilisers, organic manures and waste processes and is a member of the Defra Nutrient Management Planning Tool Industry Advisory Panel.
- BSc (Hons) Agriculture, FACTS Registration: R/FE/4173, BASIS Crop Protection: E/8937/IPM, BASIS Soil & Water: SW/533, BASIS Conservation Management: CM/224

Permit number under which this deployment application is being made: EPR/JB3037WB/D10001

2 Waste Recovery

This deployment is a waste recovery activity as the application to land of the waste water directly replaces the requirement for manufactured nitrogen, phosphate, potash, sulphur and sodium fertilisers on productive grassland used to make hay and graze livestock.

3 Waste Type

Waste producer:
Mr Simon Klein, Palmer & Klein Ltd, Ongar Hall Farm, Brentwood Road, Orsett, Essex, RM16 3HU

EWC code: 19 11 06

Waste description: Waste water from the processing of used cooking oil and fat.

Additional information: Used cooking oil and fats are processed at Ongar Hall Farm as part of a 'Preparing for re-use' stage of the Waste Hierarchy. The fats and oils are heated in order to separate the oil and water and then go through a series of filters to remove solids. The oil element then goes on to be processed into biofuel by another unrelated organisation as part of a 'Recycling' stage of the Waste Hierarchy. The solids are taken away by *** and the remaining water remains on site prior to application to land as a direct replacement to manufactured fertiliser.

4 Waste storage and spreading

Main address: Ongar Hall Farm, Brentwood Road, Orsett, Essex, RM16 3HU

12-digit national grid reference of the place of storage: TQ 65126 84474

Storage: underground tank at the processing facility then pumped to two lagoons (grid coordinates 565229,184786) prior to land spreading.

Quantity to be stored at any one time: 800 tonnes (cubic metres)

Land spreading method: vacuum tanker with low trajectory (less than 3 metres) splash plate.

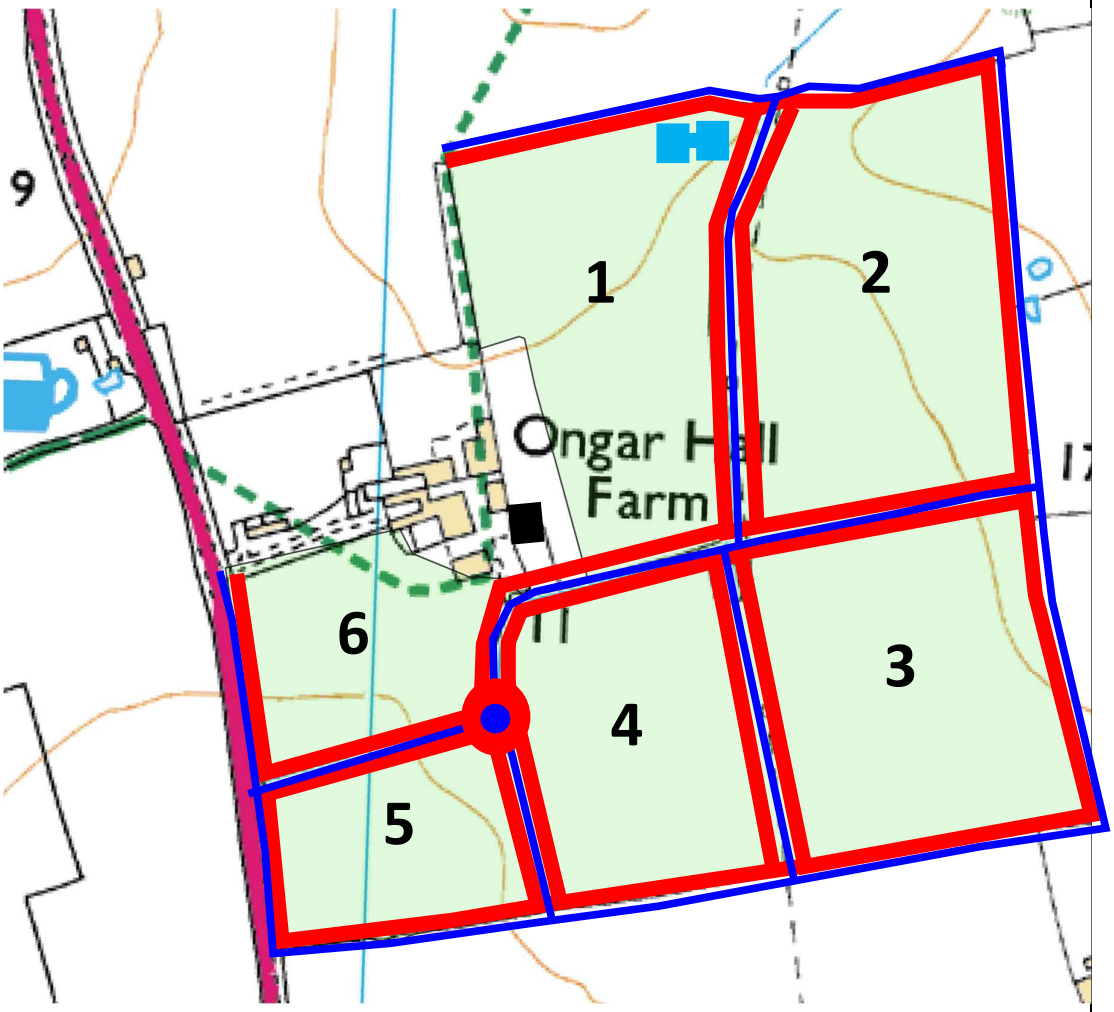
Receiving land details: 33.09 hectares

Table 1: Individual field details:

Field Ref	Coordinates	Total Field Area (Ha)	Available Spreadable Area (Ha)
1 (2264)	565206, 184641	7.10	6.24
2 (4367)	565449, 184670	9.59	8.34
3 (4934)	565499, 184358	3.95	2.94
4 (2628)	565259, 184274	6.84	5.38
5 (0317)	565022, 184200	8.02	6.85
6 (9934)	564999, 184350	4.06	3.34
	Total	**39.56**	**33.09**

Map 1: Ongar Hall Farm and Field Location Map

Map 2: Spreading Risk Map



Non-spreading area (surface water 10m/spring 50m) =

Surface water =

Spring =

Linked lagoons =

Storage tank =

All fields have a clay soil, are drained and are considered high risk for spreading.

5 Operational controls

Storage

The waste water is stored in an underground tank adjacent to the oil processing facility before being pumped to the two linked lagoons prior to land spreading. The lagoons are located away from the oil processing facility to avoid any contamination and to allow easy access by the vacuum tanker.

Cropping

All the fields are permanent grass with management generally being one or two cuts of hay followed by aftermath grazing by sheep throughout the autumn and winter months. Annual grass yields are approximately 7t/ha hay @ 86% dry matter).

Spreading

Land spreading takes place using a vacuum tanker with a low trajectory splash plate. Spreading is at a height of approximately 2 metres and a width of approximately 8 metres. Compaction and surface damage is avoided by the use of low ground pressure tyres, a small tanker and only land spreading when soil conditions are friable (dry enough to not cause compaction but are suitable for optimum nutrient uptake by the crop) but not cement hard (too dry so that cracking occurs and can lead to rapid infiltration through the soil and directly into land drains). Fields are not accessed when soil is at or beyond the plastic limit (when soil is unable to reform after contact from tyres) due to the high risk of compaction. No mole draining or sub-soiling is planned and the fields are flat so runoff is not an issue.

Two applications of 50m^3/ha are made in the spring to provide nutrients to the hay crop and then a further application of 50m^3/ha is made after the hay cut to provide nutrients for grazing. Temperature, soil moisture and grass growth are considered throughout the season and if required application rates may be reduced and/or the number of applications may be increased to balance nitrogen supply with demand. Spreading does not take place within 10 metres of surface water or hedges (every field boundary) and not within 50 metres of a spring. There are no ponds on the farm. Spreading only takes place during the day and not at dusk, dawn or at night.

Timing

All the fields are in a Nitrate Vulnerable Zone (NVZ) and also subject to the Farming Rules for Water. The waste water is subject to the 250 kg/ha total nitrogen field limit over a 12-month period and the contribution of available nitrogen is taken into account in grass nutrient planning. The total organic manure nitrogen supply in a 12-month period is 15kg/ha from applications of up to 150m^3/ha waste water. Approximately 41% of the total N content of the waste water is present as readily available N and as such will be subject to 'closed' periods for application between 15th October and 31st January. If applications are made between the end of the closed period and the end of February no more than 30m^3/ha will be applied in a single application and a minimum period of 3 weeks will elapse before any further application.

Defra's 'Protecting our Water, Soil and Air, A Code of Good Agricultural Practice for farmers, growers and land managers' requires that when there is a wish to utilise the nitrogen and other nutrients in the organic manure and the soil phosphorus Index is already 3 or above (as in Fields 2, 3 & 4), no more total phosphate should be applied than will be removed by the crops grown. This will prevent further increases in the soil phosphorus levels. The same principles apply to The Farming Rules for Water. In the hay crop taken (average 7t/ha hay @ 86% dry matter) from the field removal of phosphate (expressed as P_2O_5) will be approximately 41kg/ha P_2O_5. The total application rate of the waste water will be restricted to 150t (m^3)/ha or less, applying a maximum of approximately 11kg/ha P_2O_5, so the amount of phosphate applied by waste water will not exceed removal by the hay crop. The hay crop will remove approximately 120kg/ha potash (K_2O). This is more than the input of approximately 18kg/ha K_2O from the maximum 150m^3/ha waste water application. No organic manures other than the waste water will be applied.

6 Benefits and nutrients supplied to the land, soil and crop

This deployment is a waste recovery activity as the application to land of the waste water directly replaces the requirement for manufactured nitrogen, phosphate, potash, sulphur and sodium fertilisers on productive grassland used to make hay and graze livestock.

Table 2: Waste water analysis results 2025 (on 'as received' basis)
Sampling is carried out every year following the methodology for sampling liquid manures found in the Nutrient Management Guide (RB209) Section 2 Organic Materials. The last sampling took place in April 2025 and the results are summarised below with the full laboratory reports in Appendix 1 of this document.

General properties & plant nutrients	Unit	Result	Comment
pH	-	8.9	This pH will not cause any issues.
Total solids	%	0.25	The total solids content is very low.
Total Nitrogen	% w/w	<0.01	The result is equivalent to <0.1kg/m^3 of total nitrogen.
Ammonium-nitrogen	mg/kg	<25	Based on the ammonium-nitrogen content the waste water contains <0.041kg/m^3 of readily available nitrogen i.e. 41% of total nitrogen.
Nitrate-nitrogen	mg/kg	<10	
Nitrite-nitrogen	mg/kg	<1	
Total Phosphorus	mg/kg	31.7	The result is equivalent to 0.07kg/m^3 P_2O_5.
Total Potassium	mg/kg	96	The result is equivalent to 0.12kg/m^3 K_2O.
Total Magnesium	mg/kg	28.7	The result is equivalent to 0.05/m^3 MgO.
Total Calcium	mg/kg	24.5	The result is equivalent to 0.03kg/m^3 CaO.
Total Sodium	mg/kg	539	The result is equivalent to 0.73kg/m^3 Na_2O.
Total Sulphur	mg/kg	28.8	The result is equivalent to 0.07kg/m^3 SO_3.

Table 3: Proposed Receiving Fields 1, 2, 3, 4, 5 & 6
All the fields are permanent grass with management generally being one or two cuts of hay followed by aftermath grazing by sheep throughout the autumn and winter months.

Field	Previous Crop 2024	Next Crop 2025	Soil Type	SNS Index
1	1 cut hay + Aftermath grazing	1 cut hay + Aftermath grazing	Clay	Low
2	1 cut hay + Aftermath grazing	1 cut hay + Aftermath grazing	Clay	Low
3	1 cut hay + Aftermath grazing	1 cut hay + Aftermath grazing	Clay	Low
4	1 cut hay + Aftermath grazing	1 cut hay + Aftermath grazing	Clay	Low
5	1 cut hay + Aftermath grazing	1 cut hay + Aftermath grazing	Clay	Low
6	1 cut hay + Aftermath grazing	1 cut hay + Aftermath grazing	Clay	Low

Table 4: Soil Analysis Results from 2024
Sampling is carried out every 2 years following the methodology found in the Nutrient Management Guide (RB209) Section 3 Grass and Forage Crops. The last sampling took place in 2024 and the results are summarised below with the full laboratory reports in Appendix 2 of this document.

Field	pH	Phosphorus mg/l (Index)	Potassium mg/l (Index)	Magnesium mg/l (Index)
1	7.6	23.0 (2)	131 (2-)	189 (4)
2	8.0	39.2 (3)	243 (3)	292 (5)
3	7.3	44.8 (3)	203 (2+)	283 (5)
4	7.7	51.4 (4)	509 (4)	349 (5)
5	7.3	20.4 (2)	135 (2-)	568 (6)
6	7.2	24.4 (2)	140 (2-)	593 (6)

Table 5: Grass Nutrient Requirements

The requirements come from the Nutrient Management Guide (RB209) Section 3 Grass and Forage Crops.

Field	2024 crop	2025 crop	Nitrogen kg/ha	Phosphate kg/ha P_2O_5	Potash kg/ha K_2O	Sulphur kg/ha Na^20	Sodium kg/ha SO^2
1	Hay cut followed by sheep grazing all year round	Hay cut followed by sheep grazing all year round	160	30	90	40	50
2			160	0	0	40	50
3			160	0	65	40	50
4			160	0	0	40	50
5			160	30	90	40	50
6			160	30	90	40	50

Nitrogen requirements are based on all the fields having Low Soil Nitrogen Supply (as they have received less than 100kg/ha nitrogen annually) and all fields being in the Poor Grass Growth (as the average April to September rainfall is 265mm and all the fields are deep clay soils). The target dry matter production of 7-9t/ha is based on previous grass growth and harvesting results. It is recommended to apply 100kg/ha nitrogen for one hay cut (split into two applications of 50kg/ha) and up to 60kg/ha for grazing (split into two applications of 30kg/ha) depending on weather and soil conditions e.g. the total nitrogen would be reduced if there was a lack of rainfall or very heavy rainfall. If two cuts of hay were taken then Nitrogen could be increased by a further 60kg/ha.

Sulphur requirements are based on hay cuts being made late combined with above average rainfall between November and February increasing the risk of deficiency. Sodium requirements are based on improving grass palatability throughout the grazing season to increase dry matter intakes.

Table 6: Nutrient Supply from Waste Water Applications

Nutrient	Kg/t (m^3)	Amount applied by			
		30	50	100	150
		t (m^3)/ha	t (m^3)/ha	t (m^3)/ha	t (m^3)/ha
		Kg/ha			
Total Nitrogen	0.1	3	5	10	15
Ammonium-N	<0.03	<0.9	<1.5	<3	<4.5
Nitrate-N	<0.01	<0.3	<0.5	<1	<1.5
Nitrite-N	<0.1	<3	<5	<10	<15
Total Phosphate (expressed as P_2O_5)	0.07	2	4	7	11
Total Potassium (expressed as K_2O)	0.12	4	6	12	18
Magnesium (expressed as MgO)	0.05	2	3	5	8
Calcium (expressed as CaO)	0.03	1	2	3	5
Sulphur (expressed as SO_3)	0.07	2	4	7	11
Sodium (expressed as Na_2O)	0.73	22	36	73	109

Nutrients provided by waste water application

Surface applied over the late winter/spring/summer approximately 41% (calculated using MANNER *NPK)* of the waste water's total nitrogen content will be available for plant uptake i.e. around 0.041kg/t (m^3) of available nitrogen so respectively about 1.23, 2.05, 4.1 & 6.15kg/ha available nitrogen from 30, 50, 100 & 150 t(m^3)/ha of waste water. Useful amounts of potassium, sodium and sulphur will also be available to the grass. The water application will also provide useful irrigation to the soil and grass, particularly with the extended periods of no rain that have occurred in the last few growing seasons.

Table 7: Grass Nutrient Requirements with 150m^3/ha of waste water applied over the season

Field	2024 crop	2025 crop	Nitrogen kg/ha	Phosphate kg/ha P_2O_5	Potash kg/ha K_2O	Sulphur kg/ha Na^20	Sodium kg/ha SO^2
1	Hay cut followed by sheep grazing all year round	Hay cut followed by sheep grazing all year round	154	19	72	31	0
2			154	0	0	31	0
3			154	0	47	31	0
4			154	0	0	31	0
5			154	19	72	31	0
6			154	19	72	31	0

The requirements are based on two waste water applications of 50m^3/ha (a total of 100m^3/ha) for the hay crop and 50m^3/ha applied for grazing, the remaining nitrogen to be applied from bagged fertiliser would be 95kg/ha nitrogen for the hay cut and up to 58kg/ha for grazing (split into two applications of 29kg/ha) depending on weather and soil conditions e.g. the total nitrogen would be reduced if there was a lack of rainfall or very heavy rainfall. If two cuts of hay were taken then Nitrogen could be increased by a further 60kg/ha.

Summary of Agricultural Benefit:

In summary application of the waste water will confer agricultural benefit by reducing the manufactured fertiliser requirement on fields as follows:

- **Nitrogen:** Fields 1, 2, 3, 4, 5 & 6
- **Phosphate:** Fields 1, 5 & 6
- **Potash:** Fields 1, 3, 5 & 6
- **Sodium:** Fields 1, 2, 3, 4, 5 & 6
- **Sulphur:** Fields 1, 2, 3, 4, 5 & 6

7 Potential negative impacts to the land, soil or crop

Table 8: Potentially Toxic Elements (PTE), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), oils, fats, grease and chloride content of the waste water

The potential negative elements of the waste water have been analysed and summarised below whilst the full laboratory reports from April 2025 can be found in Appendix 1 of this document.

Potentially Toxic Elements (PTEs)								
PTE	**Copper (Cu)**	**Nickel (Ni)**	**Zinc (Zn)**	**Cadmium (Cd)**	**Chromium (Cr)**	**Lead (Pb)**	**Mercury (Hg)**	**Arsenic (As)**
mg/kg	<0.2	<0.2	<0.58	<0.01	0.25	<0.5	<0.05	<0.5
PTEs continued and chloride, sodium, BOD, COD, oils, fats and grease and chloride								
Parameter	**Selenium (Se)**	**Molybdenum (Mo)**	**Fluoride (F)**	**Chloride (Cl)**	**Sodium (Na)**	**BOD (fresh)**	**COD (fresh)**	**Oils, fats & grease**
mg/kg (mg/l for BOD & COD)	<0.02	<0.05	<10	273	539	53	412	<200
Comment	The PTE levels are low and below reporting limits. The Biological Oxygen Demand (BOD) of 53mg/kg is, for example, well below the range (1,000-5,000 mg/l) that might be expected for dilute dairy parlour and yard washings. The same pattern is evident for COD at 412mg/l compared to levels expected in dirty water at 3,000-5,250 mg/l. The chloride and sodium levels at the rate of application proposed would not be of concern as they would fall well below the upper limit of 2,000mg/l considered as a moderate risk to most crops.							

Table 9: Potentially Toxic Elements levels in fields 1, 2, 3, 4, 5 & 6
The potential negative element content of the receiving fields have been analysed and summarised below whilst the full laboratory reports from 2024 can be found in Appendix 2 of this document.

Field	Total Copper (Cu) mg/kg	Total Nickel (Ni) mg/kg	Total Zinc (Zn) mg/kg	Total Cadmium (Cd) mg/kg	Total Lead (Pb) mg/kg	Total Mercury (Hg) mg/kg	Total Chromium (Cr) mg/kg
1	24.1	77.4	76.4	0.33	43.9	<0.2	142.0
2	24.0	56.0	86.0	0.37	40.2	<0.2	90.5
3	24.0	42.1	83.6	0.34	41.2	<0.2	74.6
4	25.0	45.8	92.7	0.34	41.3	<0.2	76.9
5	47.8	36.5	88.2	0.35	43.9	<0.2	66.6
6	26.4	34.8	81.6	0.34	39.0	<0.2	62.1

Table 10: Maximum Permissible Potentially Toxic Elements levels

Field	Total Copper (Cu) mg/kg	Total Nickel (Ni) mg/kg	Total Zinc (Zn) mg/kg	Total Cadmium (Cd) mg/kg	Total Lead (Pb) mg/kg	Total Mercury (Hg) mg/kg	Total Chromium (Cr) mg/kg
Maximum permissible level following sewage sludge application soil pH >6	Arable 135 Grass 225	Arable 75 Grass 125	Arable 200 Grass 200	3	300	Arable 1 Grass 1.5	Arable 400 Grass 600
	kg/ha	**kg/ha**	**kg/ha**	**kg/ha**	**kg/ha**	**kg/ha**	**kg/ha**
Applied by 150m^3/ha waste water at maximum rate	<.030	<.030	<.087	<.002	<.075	<.008	<.038
Maximum permissible average annual rate of addition over a 10-year period	7.5	3	15	0.15	15	0.1	15

The soil potentially toxic element (PTE) levels are all well below the maximum permissible levels following sewage sludge application. The amount of PTEs applied by the proposed rate of waste water are all well below the maximum permissible average annual rate of addition over a 10-year period.

8 Sensitive receptors

Sensitive human receptors:

- **Odour, Noise & Contact:** There are dwellings within 600m of the fields including Wyfields Farm (460m from the south eastern field boundary, the Golden Bridge (200m from the south western field boundary, Lorkins Farm (400m away from the south western field boundary and Burrows Farm (550m from the north western field boundary). There are public footpaths shown on the OS map crossing

the north east corner of field 6 and there is also a footpath shown running along the western boundary of Field 1. There are known amenity areas in close proximity to the fields.

Sensitive environmental receptors:

- **Area of Outstanding Natural Beauty:** not applicable.
- **Local Nature Reserve:** not applicable.
- **National Nature Reserves:** not applicable.
- **National Parks:** not applicable.
- **Ramsar Sites:** not applicable.
- **Sites of Special Scientific Interest:** not applicable.
- **Special Areas of Conservation:** not applicable.
- **Special Protection Areas:** not applicable.
- **Biosphere Reserves:** not applicable.
- **Nitrate Vulnerable Zones:** applicable (Mardyke NVZ surface water).
- **Nutrient Neutrality Catchments:** not applicable.
- **Drinking Water Protected Areas (surface water):** not applicable.
- **Drinking Water Safeguard Zones (surface water):** not applicable.
- **Drinking Water Safeguard Zones (groundwater):** not applicable**.**
- **Groundwater Source Protection Zone:** applicable (SPZIII).
- **Groundwater Vulnerability:** not applicable (low).
- **Flood Risk:** not applicable (low/unlikely).
- **Nationally Protected Species and Habitats:** applicable (potentially hedgerows, trees & ditches).
- **Springs, wells & boreholes:** applicable (a spring is located at the corner where fields 4, 5 & 6 meet).

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

Sensitive human receptor mitigation measures:

- **Odour:** there is low odour potential from the waste water, however spreading will be avoided at weekends and holidays.
- **Noise control:** equipment is normal agricultural machinery and fields are within an agricultural holding, however spreading will be avoided at weekends and holidays.
- **Contact:** areas that the public can access, such as public rights of way, are all within the 10m non-spreading areas.

Sensitive environmental receptors mitigation measures:

- **Nitrate Vulnerable Zones:** The business is fully compliant with NVZ requirements including the planning and use of inorganic fertilisers and the planning, use and storage of organic manures.
- **Nationally Protected Species and Habitats:** There will be a 10m non-spreading zone adjacent to all hedges and trees and, in accordance with NVZ requirements, there will be a 10m non-spreading zone adjacent to surface water.
- **Springs, wells & boreholes:** In accordance with NVZ requirements there will be a 50m non-spreading zone from the spring.

General Mitigation Measures:

- Only trained operators will carry out land spreading.
- Land spreading will only take place when soil, temperature and weather conditions are suitable.
- Spreading machinery will be maintained and calibrated as per manufacturer's instructions.
- A low trajectory splash plate will be used to reduce ammonia losses to air.

10 Contingency planning

Mitigation Measures:

- **Machinery breakdown:** the waste water can remain stored until application machinery is repaired and/or a contractor could be used for land spreading and/or the oil processing operation could be paused and/or the waste water could be taken away by licensed waste contractor.
- **Lack of Staff:** the business has several competent operators but if need be a contractor could be used.

- **Lack of storage:** the business has ample storage for waste water production for during the closed periods and when soil/weather conditions are not suitable for land spreading but if need be the oil processing operation could be paused and/or the waste water could be taken away by licensed waste contractor.

11 Compliance with other applicable legislation

The business is fully compliant with legislative requirements including NVZs and the Farming Rules for Water and best practice guidance including Protecting our Water, Soil and Air, A Code of Good Agricultural Practice for farmers, growers and land managers. Reference to compliance has been made throughout this document.

Appendix 1: Waste Water Analysis Results Analytical Report Number 87335

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LIQUID WASTE

WASTE ANALYSIS RESULTS

Sample Reference :

1 OF 1

Sample Matrix : WASTE

Laboratory References	
Report Number	87335
Sample Number	164919

Date Received	03-APR-2025
Date Reported	16-APR-2025

The sample submitted was of adequate size to complete all analysis requested.
The sample will be kept under refrigeration for at least 3 weeks.

ANALYTICAL RESULTS *on 'as received' basis.*

Determinand	Value	Units
Oven Dry Solids	0.25	%
Total Kjeldahl Nitrogen	<0.01	% w/w
Nitrate Nitrogen	<10	mg/kg
Ammonium Nitrogen	<25	mg/kg
Total Phosphorus (P)	31.7	mg/kg
Total Potassium (K)	96.0	mg/kg
Total Magnesium (Mg)	28.7	mg/kg
Total Copper (Cu)	<0.2	mg/kg
Total Zinc (Zn)	0.58	mg/kg
Total Sulphur (S)	28.8	mg/kg

Released by *Myles Nicholson* Date *16/04/25*

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LIQUID WASTE

WASTE ANALYSIS RESULTS

Sample Reference :

1 OF 1

Sample Matrix : WASTE

Laboratory References	
Report Number	87335
Sample Number	164919

Date Received	03-APR-2025
Date Reported	16-APR-2025

The sample submitted was of adequate size to complete all analysis requested.
The sample will be kept under refrigeration for at least 3 weeks.

ANALYTICAL RESULTS *on 'as received' basis.*

Determinand	Value	Units
Total Calcium (Ca)	24.5	mg/kg
Nitrite Nitrogen	<1	mg/kg
Total Molybdenum (Mo)	<0.05	mg/kg
Total Lead (Pb)	<0.5	mg/kg
Total Cadmium (Cd)	<0.01	mg/kg
Total Mercury (Hg)	<0.05	mg/kg
Total Nickel (Ni)	<0.2	mg/kg
Total Chromium (Cr)	0.25	mg/kg
Total Sodium (Na)	539	mg/kg
pH 1:6 [Fresh]	8.90	

Released by *Myles Nicholson* Date *16/04/25*

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LIQUID WASTE

WASTE ANALYSIS RESULTS

Sample Reference :

1 OF 1

Sample Matrix : WASTE

Laboratory References	
Report Number	87335
Sample Number	164919

Date Received	03-APR-2025
Date Reported	16-APR-2025

The sample submitted was of adequate size to complete all analysis requested.
The sample will be kept under refrigeration for at least 3 weeks.

ANALYTICAL RESULTS *on 'as received' basis.*

Determinand	Value	Units
Chloride	273	mg/kg
Fluoride [100:1 H2S04 Soluble]	<10	mg/kg
Total Arsenic (As)	<0.5	mg/kg
Total Selenium (Se)	<0.02	mg/kg
B.O.D. [fresh]	53	mg/l
C.O.D. [fresh]	412	mg/kg
Oils,Fats and Grease	<200	mg/kg

Released by *Myles Nicholson* Date *16/04/25*

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Appendix 2: Soil Analysis Results Analytical Report Number 27836

SOIL CHEMICAL ANALYSIS REPORT FOR FIELD - F1 BARN FIELD

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SOIL

Date Received	15-MAR-2024
Date Reported	25-MAR-2024

Laboratory References

Report Number	27836
Sample Number	687133

ANALYTICAL RESULTS *on 'dry matter' basis.*

pH (1)

Determinand	Result	Soil pH 4 5 6 7 8 9
Soil pH	7.6	

Soil Nutrients (1)

Determinand	Result mg/litre	Soil Index	Soil Index 0 1 2 3 4 5 6
Available Phosphorus	23.0	2	
Available Potassium	131	2-	
Available Magnesium	189	4	

Potentially Toxic Elements (2)

Determinand	Result mg/kg		Maximum mg/kg	% of maximum permissible concentration of PTE in arable/grassland soil 0% 25% 50% 75% 100%
Total Copper	24.1	Arable	200	
		Grassland	330	
Total Zinc	76.4	Arable	300	
		Grassland	300	
Total Nickel	77.4	Arable	110	
		Grassland	180	
Total Cadmium	0.33	Arable	3	
		Grassland	3	
Total Lead	43.9	Arable	300	
		Grassland	300	
Total Chromium	142	Arable	400	
		Grassland	600	
Total Mercury	<0.2	Arable	1	
		Grassland	1.5	

(1) Recommendations for liming and fertiliser should be obtained from Defra's Fertiliser Manual (RB209). The analytical methods used are as described in Defra's RB427.

(2) Concentration of Potentially Toxic Elements (PTE, commonly referred to as 'heavy metals') are in mg/kg dry soil. The maximum and the percentage of this maximum permissible concentration of PTE in soil are derived from the values in Defra's Code of Practice for Agricultural Use of Sewage Sludge (England & Wales) 1996. If applying organic manures to this soil it is important to ensure the soil is managed with a pH no less than 5.0, and that the PTE maximum values are not exceeded following the application. For soil where the pH value is less than 5.2, a FACTS Qualified Adviser should be consulted. Further details are provided in the Sludge Code.

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SOIL CHEMICAL ANALYSIS REPORT FOR FIELD - F2 FAR LEFT

MEL HOLLOWAY
MJH CONSULTANCY
ATHEL COTTAGE
CHURCH LANE
BLYTHBURGH
HALESWORTH IP19 9LP

Y158

Please quote above code for all enquiries

SOIL

Date Received	15-MAR-2024
Date Reported	25-MAR-2024

Laboratory References

Report Number	27836
Sample Number	687134

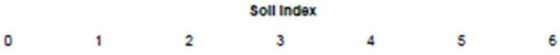
ANALYTICAL RESULTS *on 'dry matter' basis.*

pH (1)

Determinand	Result
Soil pH	8.0

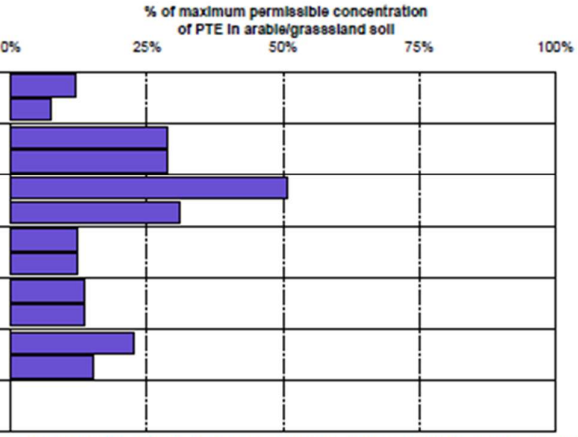
Soil Nutrients (1)

Determinand	Result mg/litre	Soil Index
Available Phosphorus	39.2	3
Available Potassium	343	3
Available Magnesium	292	5



Potentially Toxic Elements (2)

Determinand	Result mg/kg		Maximum mg/kg
Total Copper	24.0	Arable	200
		Grassland	330
Total Zinc	86.0	Arable	300
		Grassland	300
Total Nickel	56.0	Arable	110
		Grassland	180
Total Cadmium	0.37	Arable	3
		Grassland	3
Total Lead	40.2	Arable	300
		Grassland	300
Total Chromium	90.5	Arable	400
		Grassland	600
Total Mercury	<0.2	Arable	1
		Grassland	1.5



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SOIL CHEMICAL ANALYSIS REPORT FOR FIELD - F3 FAR CORNER FIELD

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HALESWORTH IP19 9LP

Y158

Please quote above code for all enquiries

SOIL

Date Received	15-MAR-2024
Date Reported	25-MAR-2024

Laboratory References

Report Number	27836
Sample Number	687135

ANALYTICAL RESULTS *on 'dry matter' basis.*

pH (1)

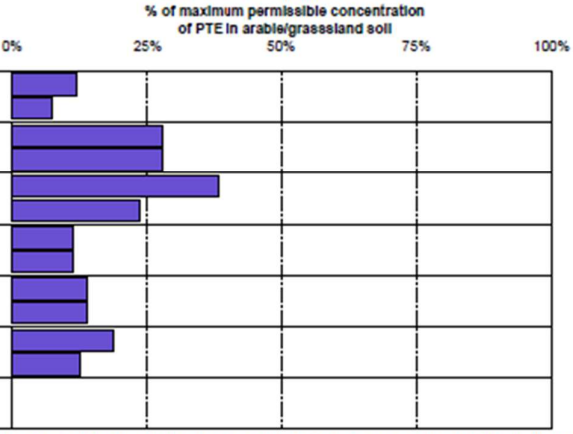
Determinand	Result
Soil pH	7.3

Soil Nutrients (1)

Determinand	Result mg/litre	Soil Index
Available Phosphorus	44.8	3
Available Potassium	203	2+
Available Magnesium	283	5

Potentially Toxic Elements (2)

Determinand	Result mg/kg		Maximum mg/kg
Total Copper	24.0	Arable	200
		Grassland	330
Total Zinc	83.6	Arable	300
		Grassland	300
Total Nickel	42.1	Arable	110
		Grassland	180
Total Cadmium	0.34	Arable	3
		Grassland	3
Total Lead	41.2	Arable	300
		Grassland	300
Total Chromium	74.6	Arable	400
		Grassland	600
Total Mercury	<0.2	Arable	1
		Grassland	1.5



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(2) Concentration of Potentially Toxic Elements (PTE, commonly referred to as 'heavy metals') are in mg/kg dry soil. The maximum and the percentage of this maximum permissible concentration of PTE in soil are derived from the values in Defra's Code of Practice for Agricultural Use of Sewage Sludge (England & Wales) 1996. If applying organic manures to this soil it is important to ensure the soil is managed with a pH no less than 5.0, and that the PTE maximum values are not exceeded following the application. For soil where the pH value is less than 5.2, a FACTS Qualified Adviser should be consulted. Further details are provided in the Sludge Code.

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SOIL CHEMICAL ANALYSIS REPORT FOR FIELD - F4 DUNS HEAP

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HALESWORTH IP19 9LP

Y158

Please quote above code for all enquiries

SOIL

Date Received	15-MAR-2024
Date Reported	25-MAR-2024

Laboratory References

Report Number	27836
Sample Number	687136

ANALYTICAL RESULTS *on 'dry matter' basis.*

pH (1)

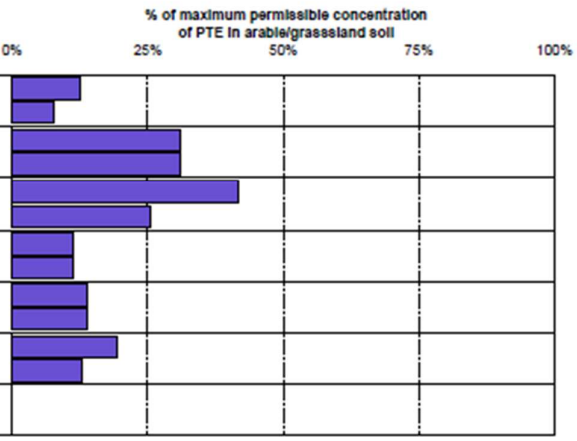
Determinand	Result
Soil pH	7.7

Soil Nutrients (1)

Determinand	Result mg/litre	Soil Index
Available Phosphorus	51.4	4
Available Potassium	509	4
Available Magnesium	349	5

Potentially Toxic Elements (2)

Determinand	Result mg/kg		Maximum mg/kg
Total Copper	25.0	Arable	200
		Grassland	330
Total Zinc	92.7	Arable	300
		Grassland	300
Total Nickel	45.8	Arable	110
		Grassland	180
Total Cadmium	0.34	Arable	3
		Grassland	3
Total Lead	41.3	Arable	300
		Grassland	300
Total Chromium	76.9	Arable	400
		Grassland	600
Total Mercury	<0.2	Arable	1
		Grassland	1.5



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(2) Concentration of Potentially Toxic Elements (PTE, commonly referred to as 'heavy metals') are in mg/kg dry soil. The maximum and the percentage of this maximum permissible concentration of PTE in soil are derived from the values in Defra's Code of Practice for Agricultural Use of Sewage Sludge (England & Wales) 1996. If applying organic manures to this soil it is important to ensure the soil is managed with a pH no less than 5.0, and that the PTE maximum values are not exceeded following the application. For soil where the pH value is less than 5.2, a FACTS Qualified Adviser should be consulted. Further details are provided in the Sludge Code.

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SOIL CHEMICAL ANALYSIS REPORT FOR FIELD - F5 FAR FRONT FIELD

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HALESWORTH IP19 9LP

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Please quote above code for all enquiries

SOIL

Date Received	15-MAR-2024
Date Reported	25-MAR-2024

Laboratory References

Report Number	27836
Sample Number	687137

ANALYTICAL RESULTS *on 'dry matter' basis.*

pH (1)

Determinand	Result	Soil pH (4 5 6 7 8 9)
Soil pH	7.3	

Soil Nutrients (1)

Determinand	Result mg/litre	Soil Index	Soil Index (0 1 2 3 4 5 6)
Available Phosphorus	20.4	2	
Available Potassium	135	2-	
Available Magnesium	568	6	

Potentially Toxic Elements (2)

Determinand	Result mg/kg		Maximum mg/kg	% of maximum permissible concentration of PTE in arable/grassland soil (0% 25% 50% 75% 100%)
Total Copper	47.8	Arable	200	
		Grassland	330	
Total Zinc	88.2	Arable	300	
		Grassland	300	
Total Nickel	36.5	Arable	110	
		Grassland	180	
Total Cadmium	0.35	Arable	3	
		Grassland	3	
Total Lead	43.9	Arable	300	
		Grassland	300	
Total Chromium	66.6	Arable	400	
		Grassland	600	
Total Mercury	<0.2	Arable	1	
		Grassland	1.5	

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SOIL CHEMICAL ANALYSIS REPORT FOR FIELD - F6 FRONT FIELD

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SOIL

Date Received	15-MAR-2024
Date Reported	25-MAR-2024

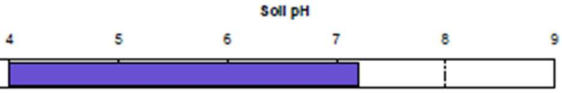
Laboratory References

Report Number	27836
Sample Number	687138

ANALYTICAL RESULTS *on 'dry matter' basis.*

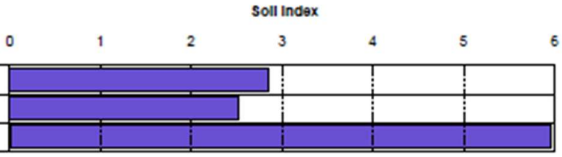
pH (1)

Determinand	Result
Soil pH	7.2



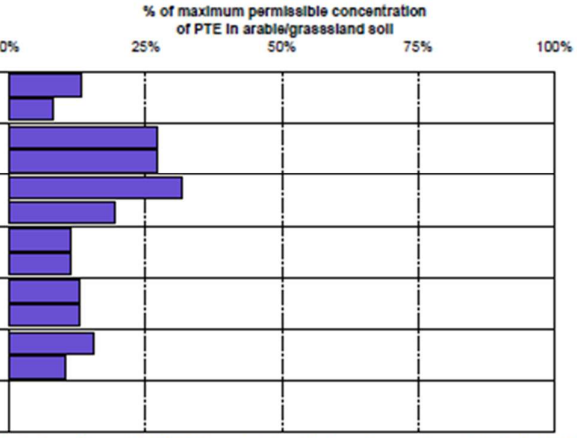
Soil Nutrients (1)

Determinand	Result mg/litre	Soil Index
Available Phosphorus	24.4	2
Available Potassium	140	2-
Available Magnesium	593	6



Potentially Toxic Elements (2)

Determinand	Result mg/kg		Maximum mg/kg
Total Copper	26.4	Arable	200
		Grassland	330
Total Zinc	81.6	Arable	300
		Grassland	300
Total Nickel	34.8	Arable	110
		Grassland	180
Total Cadmium	0.34	Arable	3
		Grassland	3
Total Lead	39.0	Arable	300
		Grassland	300
Total Chromium	62.1	Arable	400
		Grassland	600
Total Mercury	<0.2	Arable	1
		Grassland	1.5



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