REFERENCE

2425258

RELEASE DATE

August 2024

SUBJECT

Phosphorus content of Wastewater sludge flows & incineration residues.

REQUEST & RESPONSE

Please send me any determinations made of the phosphorus content of the flows of sludge and of the flows of the incineration residues.

Annex A contains the results of total phosphorus content conducted by our sewage sludge disposal supply chain on the incinerator ash residues presented for end disposal. This analysis details total Phosphorous based on acid extractable Aqua Regia digestion and also available Phosphorous and are results relating to 4 weekly composite samples of all the incinerator ash being received by the supply chain partner. Annex B contains the latest annual spot sample analysis for wastewater sludge cake received by our disposal supply chain from the various NI Water WWTW sludge cake production centres. The relevant phosphorus results are highlighted in yellow.

Under Regulation 13 of the Environmental Information Regulations 2004 (Personal Information), the personal details of third parties have been redacted in black. All exceptions under the Regulations are qualified and so, in deciding whether or not to disclose the requested information, NI Water must consider the public interest. The Information Commissioners Office considers that information requested should be released unless the public interest weighs in favour of withholding such information. The public interest in the information requested being released is that it clarifies incomplete information. Against this, NI Water has balanced the interest in protecting personal information which could identify named third parties.

NI Water and its sludge disposal supply chain hold no phosphorus related analytical records for flue gas residues.

FOLLOW-UP QUERY

- I have looked more closely at the data which you sent me about sludge handling and measurements of total phosphorus made in samples of WWTW sludge. Perhaps you can confirm that I have understood properly some of the key data?
- In the 2023 reporting period the dry weight of WWTW sludge treated by incineration or by farmland advanced was 36524 tonnes.
- 10 samples of sludge from drying sites were taken in February 2024 and analysed for TP. The average of the reported results is 1.36% of the dry weight. If these not exactly coincident values are taken, then a yearly total of TP in the WWTW sludge can be estimated as 496726 kg/y.
- My difficulty at present is that this amount exceeds a reasonable estimate of the yearly total TP contained in human sewage produced in the catchment area of Lough Neagh. My question is whether there are other significant flows of TP entering the WWTWs. If so, what are they and how much is there in each case?

REPLY

- The 10 sludge cake samples reflect 10 of the 11 dewatering facilities across the whole of Northern Ireland**.** There is no sample of sludge at the 11th dewatering centre (Belfast) dewatering centre, which contributed 16,144 of the 36,524 of dry solids sludge derived for disposal for the year in question. It is therefore not clear if this would affect the requestors simple average TP.
- The requester's calculated derivation of 497 tonnes per year TP, using 36,525 as the basis of the calculation, is therefore reflective of TP loading across the whole of Northern Ireland, and not just loading derived from within the catchment of Lough Neagh.
- NIW do not hold records of either sludge quantities or % TP sludge analysis that are Lough Neagh catchment specific.
- With regards to analytical records for influent TP content of WWTWs, Annex C attached refers.

Project / Site name: ISSA (Incinerated Sewage Sludge Ash)

Sample Reference			ISSA weeks 1-4 2022	ISSA weeks 5-8 2022	ISSA weeks 9-12 2023	ISSA weeks 13-16 2022	ISSA Weeks 17-20 2022	ISSA weeks 21-24 2022	ISSA weeks 25-28 2022	ISSA weeks 29-32 2022	ISSA weeks 33-36 2022	ISSA weeks 37-40 2022	ISSA weeks 41-44 2022	ISSA weeks 45-48 2022	ISSA weeks 49-52 2022	ISSA weeks 1-4 2023	ISSA weeks 5-8 2023	ISSA weeks 9-12 2023	ISSA weeks 13-16 2023	ISSA weeks 17-20 2023	ISSA Weeks 21-24 2023	ISSA Weeks 25-28 2023	ISSA Weeks 29-32 2023	ISSA Weeks 33-36 2023	ISSA Weeks 37-40 2023	ISSA Weeks 41-44 2023	ISSA Weeks 45-48 2023	ISSA Weeks 49-52 2023	ISSA Weeks 1-4 2024	ISSA Weeks 5-8 2024	ISSA Weeks 9-12 2024	ISSA Weeks 13-16 2024	ISSA Weeks 17-20 2024	ISSA Weeks 21-24 2024
Analytical Parameter	Units	Limit of detection															Retest																
Phosphorus (available)	mg/l	1	190	180	210	180	180	190	200	200	230	230	220	190	190	200	190	170	230	240	320	280	210	180	240	200	160	240	190	190	140	180	180	190
Phosphorus (aqua regia extractable)	mg/kg	20	44000	80000	57000	59000	60000	76000	27000	60000	25000	56000	33000	34000	37000	39000	60000	83000	63000	29000	32000	24000	72000	73000	40000	54000	51000	60000	39000	64000	60000	43000	50000	48000

MCQUILLAN ENVIRONMENTAL

Test Certificate

Certificate: **ECTC030633**

Issue No: **1**

Amendment To Report:

Veolia Water Outsourcing Ltd
115-121 Duncrue Street
Belfast
BT3 9AR

McQuillan Envirocare Ltd t/a McQuillan Environmental
Caulside Drive, New Park Industrial Estate
Antrim, BT41 2DU

Tel: (028) 9446 6708
Fax: (028) 9442 9580

MCQ Job Number	ORD-32228	Sample Receipt Date	13/02/2024
MCQ Quote Number	ECA-5528-2	Date Analysis Started	15/02/2024
Purchase Order Number	Card	Completion Date	07/03/2024
No. of Samples	10	Turnaround Time	10 working days

Dear [redacted],

Analysis of your sample(s) is now complete and we have pleasure in enclosing the appropriate test report.

All analysis was completed within McQuillan Environmental Analytical Laboratory (MCQ) unless otherwise specified. Results relate only to the items tested. Any analysis that was subcontracted to an approved laboratory is indicated by 'S'. Please refer to the table at the end of your test certificate for explanations of sample deviations.

Where sample data is provided by the customer, the results relate to the sample supplied and on the basis that this data is correct. Incorrect sampling dates and/or sample information will affect the validity of results. This Test Certificate supersedes any version previously issued by the laboratory. The report shall not be reproduced except in full without approval of the laboratory.

Should you have any queries regarding this report(s) or any part of our service, please contact Sample Booking on 028 9448 3195 who will be happy to discuss your requirements.

Thank you for using our Laboratory and we look forward to receiving your next samples.

Yours Sincerely

[redacted]

Report Authorised by: [redacted]

Position: Senior Lab Administrator

Date Issued: 07/03/2024

Lab Ref	Sample Details	Sample Date	Method No.	Test	Result	Units	ACC	Lab	Sample Deviations
MCQ131012	Antrim	07/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 13:25 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131013	Portrush	06/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 00:00 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131014	Ballynacor	06/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 00:00 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131015	Kinnegar	07/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 12:11 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131016	New Holland	06/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 00:00 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131017	Culmore	07/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 13:05 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131018	Omagh	07/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 07:57 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131019	Enniskillen	07/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 06:52 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131020	Strabane	08/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 00:00 Sample Matrix: Sludge (S) Analyst Comments:									
MCQ131021	Dunmurray	08/02/2024	N/A	Veolia Sludge Suite	See below	-	N	S	
Time Sampled: 14:59 Sample Matrix: Sludge (S) Analyst Comments:									

Sample Deviations:

Sample Deviations Legend - Results may be compromised if the following deviations apply			
Comment	C	Incorrect Container	‡
Container with Headspace provided	8	Insufficient sample volume	Ë
BOD Overdiluted, therefore result indicative only	$	BOD Underdiluted, therefore result indicative only	#
High Chloride concentration, COD could not be determined	§	Holding time exceeded due to sampled on date/time	@
Holding time exceeded in Lab	±	Holding time exceeded due to delayed instructions	&
Sample integrity Jeopardized in receipt	Ø		

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : ANTRIM

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156240

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		8.14		
Oven Dry Matter	%	30.0	300.0	kg DM
Total Nitrogen	% w/w	4.77	28.62	Units N
Ammonium Nitrogen	mg/kg	16881	10.13	Units NH4-N
Total Phosphorus (P)	% w/w	1.71	23.50	Units P2O5
Total Potassium (K)	% w/w	0.148	1.07	Units K2O
Total Magnesium (Mg)	% w/w	0.337	3.36	Units MgO
Total Sulphur (S)	% w/w	0.667	10.01	Units SO3
Total Copper (Cu)	mg/kg	96.2	0.03	kg Cu
Total Zinc (Zn)	mg/kg	362	0.11	kg Zn
Total Calcium (Ca)	mg/kg	16286	4.89	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : ANTRIM

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156240

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	16286
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	4053
Total Iron (Fe)	mg/kg	30520
Total Molybdenum (Mo)	mg/kg	2.64
Total Manganese (Mn)	mg/kg	262
Total Lead (Pb)	mg/kg	13.7
Total Cadmium (Cd)	mg/kg	0.301
Total Mercury (Hg)	mg/kg	0.276
Total Nickel (Ni)	mg/kg	20.9
Total Chromium (Cr)	mg/kg	19.2
Organic Matter LOI	% w/w	80.6
Lime Equivalent as CaCO3	% w/w	<2
Fluoride [100:1 H2S04 Soluble]	mg/kg	40.8
Total Arsenic (As)	mg/kg	1.89
Total Selenium (Se)	mg/kg	0.755
Total Boron (B)	mg/kg	8.64

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : ANTRIM
Sample Matrix : WASTE
The sample submitted was small and made it difficult to complete all analysis requested.
The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156240

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	63000
Salmonella spp [fresh]	in 25g	Positive
N. V. as CaO equivalents	% w/w	<1

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : PORTRUSH
Sample Matrix : WASTE
The sample submitted was small and made it difficult to complete all analysis requested.
The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156241

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		8.38		
Oven Dry Matter	%	24.7	247.0	kg DM
Total Nitrogen	% w/w	6.06	29.94	Units N
Ammonium Nitrogen	mg/kg	21719	10.73	Units NH4-N
Total Phosphorus (P)	% w/w	1.02	11.54	Units P2O5
Total Potassium (K)	% w/w	0.140	0.83	Units K2O
Total Magnesium (Mg)	% w/w	0.549	4.50	Units MgO
Total Sulphur (S)	% w/w	0.816	10.08	Units SO3
Total Copper (Cu)	mg/kg	159	0.04	kg Cu
Total Zinc (Zn)	mg/kg	424	0.10	kg Zn
Total Calcium (Ca)	mg/kg	14106	3.48	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : PORTRUSH

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156241

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	14106
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	4448
Total Iron (Fe)	mg/kg	12856
Total Molybdenum (Mo)	mg/kg	4.20
Total Manganese (Mn)	mg/kg	236
Total Lead (Pb)	mg/kg	43.9
Total Cadmium (Cd)	mg/kg	0.476
Total Mercury (Hg)	mg/kg	0.416
Total Nickel (Ni)	mg/kg	53.3
Total Chromium (Cr)	mg/kg	43.1
Organic Matter LOI	% w/w	77.4
Lime Equivalent as CaCO3	% w/w	2.66
Fluoride [100:1 H2S04 Soluble]	mg/kg	25.9
Total Arsenic (As)	mg/kg	2.83
Total Selenium (Se)	mg/kg	1.18
Total Boron (B)	mg/kg	28.2

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : PORTRUSH

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156241

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	28500
Salmonella spp [fresh]	in 25g	Negative
N. V. as CaO equivalents	% w/w	1.49

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : BALLYNACOR

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156242

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		6.77		
Oven Dry Matter	%	26.7	267.0	kg DM
Total Nitrogen	% w/w	4.29	22.91	Units N
Ammonium Nitrogen	mg/kg	10119	5.40	Units NH4-N
Total Phosphorus (P)	% w/w	1.83	22.38	Units P2O5
Total Potassium (K)	% w/w	0.127	0.82	Units K2O
Total Magnesium (Mg)	% w/w	0.402	3.56	Units MgO
Total Sulphur (S)	% w/w	0.758	10.12	Units SO3
Total Copper (Cu)	mg/kg	112	0.03	kg Cu
Total Zinc (Zn)	mg/kg	435	0.12	kg Zn
Total Calcium (Ca)	mg/kg	14752	3.94	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : BALLYNACOR

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156242

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	14752
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	2197
Total Iron (Fe)	mg/kg	38696
Total Molybdenum (Mo)	mg/kg	3.79
Total Manganese (Mn)	mg/kg	382
Total Lead (Pb)	mg/kg	29.5
Total Cadmium (Cd)	mg/kg	0.404
Total Mercury (Hg)	mg/kg	0.856
Total Nickel (Ni)	mg/kg	32.4
Total Chromium (Cr)	mg/kg	127
Organic Matter LOI	% w/w	55.0
Lime Equivalent as CaCO3	% w/w	2.73
Fluoride [100:1 H2S04 Soluble]	mg/kg	68.4
Total Arsenic (As)	mg/kg	3.52
Total Selenium (Se)	mg/kg	0.991
Total Boron (B)	mg/kg	9.51

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : BALLYNACOR

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156242

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	40650
Salmonella spp [fresh]	in 25g	Positive
N. V. as CaO equivalents	% w/w	1.53

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : KINNEGAR

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156243

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		7.75		
Oven Dry Matter	%	25.3	253.0	kg DM
Total Nitrogen	% w/w	3.91	19.78	Units N
Ammonium Nitrogen	mg/kg	9862	4.99	Units NH4-N
Total Phosphorus (P)	% w/w	0.730	8.46	Units P2O5
Total Potassium (K)	% w/w	0.095	0.58	Units K2O
Total Magnesium (Mg)	% w/w	0.307	2.58	Units MgO
Total Sulphur (S)	% w/w	0.531	6.72	Units SO3
Total Copper (Cu)	mg/kg	111	0.03	kg Cu
Total Zinc (Zn)	mg/kg	359	0.09	kg Zn
Total Calcium (Ca)	mg/kg	8702	2.20	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : KINNEGAR

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156243

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	8702
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	1944
Total Iron (Fe)	mg/kg	7859
Total Molybdenum (Mo)	mg/kg	3.15
Total Manganese (Mn)	mg/kg	120
Total Lead (Pb)	mg/kg	44.9
Total Cadmium (Cd)	mg/kg	0.477
Total Mercury (Hg)	mg/kg	0.585
Total Nickel (Ni)	mg/kg	16.1
Total Chromium (Cr)	mg/kg	59.9
Organic Matter LOI	% w/w	81.2
Lime Equivalent as CaCO3	% w/w	<2
Fluoride [100:1 H2S04 Soluble]	mg/kg	46.7
Total Arsenic (As)	mg/kg	2.27
Total Selenium (Se)	mg/kg	1.22
Total Boron (B)	mg/kg	9.77

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : KINNEGAR
Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.
The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156243

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	48600
Salmonella spp [fresh]	in 25g	Positive
N. V. as CaO equivalents	% w/w	<1

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : NEW HOLLAND
Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.
The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156244

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		6.54		
Oven Dry Matter	%	27.2	272.0	kg DM
Total Nitrogen	% w/w	4.84	26.33	Units N
Ammonium Nitrogen	mg/kg	8836	4.81	Units NH4-N
Total Phosphorus (P)	% w/w	1.81	22.55	Units P2O5
Total Potassium (K)	% w/w	0.100	0.66	Units K2O
Total Magnesium (Mg)	% w/w	0.276	2.49	Units MgO
Total Sulphur (S)	% w/w	0.630	8.57	Units SO3
Total Copper (Cu)	mg/kg	80.0	0.02	kg Cu
Total Zinc (Zn)	mg/kg	399	0.11	kg Zn
Total Calcium (Ca)	mg/kg	13848	3.77	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : NEW HOLLAND

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156244

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	13848
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	2081
Total Iron (Fe)	mg/kg	33020
Total Molybdenum (Mo)	mg/kg	3.08
Total Manganese (Mn)	mg/kg	721
Total Lead (Pb)	mg/kg	16.5
Total Cadmium (Cd)	mg/kg	0.356
Total Mercury (Hg)	mg/kg	0.223
Total Nickel (Ni)	mg/kg	15.7
Total Chromium (Cr)	mg/kg	19.4
Organic Matter LOI	% w/w	78.6
Lime Equivalent as CaCO3	% w/w	<2
Fluoride [100:1 H2S04 Soluble]	mg/kg	21.3
Total Arsenic (As)	mg/kg	2.56
Total Selenium (Se)	mg/kg	0.940
Total Boron (B)	mg/kg	12.7

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : NEW HOLLAND

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156244

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	54900
Salmonella spp [fresh]	in 25g	Negative
N. V. as CaO equivalents	% w/w	<1

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : CULMORE

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156245

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		7.38		
Oven Dry Matter	%	27.8	278.0	kg DM
Total Nitrogen	% w/w	4.81	26.74	Units N
Ammonium Nitrogen	mg/kg	10094	5.61	Units NH4-N
Total Phosphorus (P)	% w/w	0.836	10.64	Units P2O5
Total Potassium (K)	% w/w	0.083	0.56	Units K2O
Total Magnesium (Mg)	% w/w	0.368	3.40	Units MgO
Total Sulphur (S)	% w/w	0.562	7.81	Units SO3
Total Copper (Cu)	mg/kg	126	0.04	kg Cu
Total Zinc (Zn)	mg/kg	391	0.11	kg Zn
Total Calcium (Ca)	mg/kg	10210	2.84	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : CULMORE

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156245

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	10210
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	1868
Total Iron (Fe)	mg/kg	13705
Total Molybdenum (Mo)	mg/kg	3.32
Total Manganese (Mn)	mg/kg	177
Total Lead (Pb)	mg/kg	35.3
Total Cadmium (Cd)	mg/kg	0.459
Total Mercury (Hg)	mg/kg	0.324
Total Nickel (Ni)	mg/kg	22.9
Total Chromium (Cr)	mg/kg	25.3
Organic Matter LOI	% w/w	78.3
Lime Equivalent as CaCO3	% w/w	<2
Fluoride [100:1 H2S04 Soluble]	mg/kg	28.6
Total Arsenic (As)	mg/kg	3.96
Total Selenium (Se)	mg/kg	1.06
Total Boron (B)	mg/kg	11.4

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : CULMORE
Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.
The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156245

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	45150
Salmonella spp [fresh]	in 25g	Positive
N. V. as CaO equivalents	% w/w	<1

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : OMAGH
Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.
The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156246

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		6.77		
Oven Dry Matter	%	21.5	215.0	kg DM
Total Nitrogen	% w/w	4.09	17.59	Units N
Ammonium Nitrogen	mg/kg	9833	4.23	Units NH4-N
Total Phosphorus (P)	% w/w	0.855	8.42	Units P2O5
Total Potassium (K)	% w/w	0.145	0.75	Units K2O
Total Magnesium (Mg)	% w/w	0.334	2.38	Units MgO
Total Sulphur (S)	% w/w	0.610	6.56	Units SO3
Total Copper (Cu)	mg/kg	111	0.02	kg Cu
Total Zinc (Zn)	mg/kg	674	0.14	kg Zn
Total Calcium (Ca)	mg/kg	12863	2.77	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : OMAGH

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156246

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	12863
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	1705
Total Iron (Fe)	mg/kg	11293
Total Molybdenum (Mo)	mg/kg	2.81
Total Manganese (Mn)	mg/kg	216
Total Lead (Pb)	mg/kg	30.6
Total Cadmium (Cd)	mg/kg	0.474
Total Mercury (Hg)	mg/kg	0.442
Total Nickel (Ni)	mg/kg	20.9
Total Chromium (Cr)	mg/kg	35.1
Organic Matter LOI	% w/w	79.8
Lime Equivalent as CaCO3	% w/w	<2
Fluoride [100:1 H2S04 Soluble]	mg/kg	34.3
Total Arsenic (As)	mg/kg	4.19
Total Selenium (Se)	mg/kg	1.23
Total Boron (B)	mg/kg	9.16

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : OMAGH

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156246

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	44550
Salmonella spp [fresh]	in 25g	Negative
N. V. as CaO equivalents	% w/w	<1

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : ENNISKILLEN

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156247

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		7.66		
Oven Dry Matter	%	23.9	239.0	kg DM
Total Nitrogen	% w/w	4.80	22.94	Units N
Ammonium Nitrogen	mg/kg	12223	5.84	Units NH4-N
Total Phosphorus (P)	% w/w	1.63	17.84	Units P2O5
Total Potassium (K)	% w/w	0.120	0.69	Units K2O
Total Magnesium (Mg)	% w/w	0.207	1.64	Units MgO
Total Sulphur (S)	% w/w	0.845	10.10	Units SO3
Total Copper (Cu)	mg/kg	120	0.03	kg Cu
Total Zinc (Zn)	mg/kg	459	0.11	kg Zn
Total Calcium (Ca)	mg/kg	20068	4.80	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : ENNISKILLEN

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156247

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	20068
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	2010
Total Iron (Fe)	mg/kg	20230
Total Molybdenum (Mo)	mg/kg	3.62
Total Manganese (Mn)	mg/kg	168
Total Lead (Pb)	mg/kg	17.2
Total Cadmium (Cd)	mg/kg	0.478
Total Mercury (Hg)	mg/kg	0.492
Total Nickel (Ni)	mg/kg	21.0
Total Chromium (Cr)	mg/kg	30.9
Organic Matter LOI	% w/w	73.9
Lime Equivalent as CaCO3	% w/w	2.15
Fluoride [100:1 H2S04 Soluble]	mg/kg	140
Total Arsenic (As)	mg/kg	3.15
Total Selenium (Se)	mg/kg	1.25
Total Boron (B)	mg/kg	8.43

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : ENNISKILLEN

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156247

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	36150
Salmonella spp [fresh]	in 25g	Negative
N. V. as CaO equivalents	% w/w	1.21

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : STRABANE

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156248

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		7.60		
Oven Dry Matter	%	24.7	247.0	kg DM
Total Nitrogen	% w/w	6.11	30.18	Units N
Ammonium Nitrogen	mg/kg	12444	6.15	Units NH4-N
Total Phosphorus (P)	% w/w	1.00	11.31	Units P2O5
Total Potassium (K)	% w/w	0.127	0.76	Units K2O
Total Magnesium (Mg)	% w/w	0.385	3.16	Units MgO
Total Sulphur (S)	% w/w	0.964	11.91	Units SO3
Total Copper (Cu)	mg/kg	165	0.04	kg Cu
Total Zinc (Zn)	mg/kg	777	0.19	kg Zn
Total Calcium (Ca)	mg/kg	14470	3.57	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : STRABANE

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156248

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	14470
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	1870
Total Iron (Fe)	mg/kg	15736
Total Molybdenum (Mo)	mg/kg	4.55
Total Manganese (Mn)	mg/kg	272
Total Lead (Pb)	mg/kg	44.4
Total Cadmium (Cd)	mg/kg	0.964
Total Mercury (Hg)	mg/kg	0.423
Total Nickel (Ni)	mg/kg	36.0
Total Chromium (Cr)	mg/kg	54.2
Organic Matter LOI	% w/w	71.2
Lime Equivalent as CaCO3	% w/w	3.69
Fluoride [100:1 H2S04 Soluble]	mg/kg	45.6
Total Arsenic (As)	mg/kg	4.72
Total Selenium (Se)	mg/kg	2.04
Total Boron (B)	mg/kg	15.6

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : STRABANE

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156248

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	41100
Salmonella spp [fresh]	in 25g	Positive
N. V. as CaO equivalents	% w/w	2.07

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : DUNMURRAY

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156249

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value	Amount per fresh ton	
pH 1:6 [Fresh]		8.04		
Oven Dry Matter	%	21.8	218.0	kg DM
Total Nitrogen	% w/w	5.38	23.46	Units N
Ammonium Nitrogen	mg/kg	13356	5.82	Units NH4-N
Total Phosphorus (P)	% w/w	2.21	22.07	Units P2O5
Total Potassium (K)	% w/w	0.078	0.41	Units K2O
Total Magnesium (Mg)	% w/w	0.226	1.64	Units MgO
Total Sulphur (S)	% w/w	0.764	8.33	Units SO3
Total Copper (Cu)	mg/kg	103	0.02	kg Cu
Total Zinc (Zn)	mg/kg	446	0.10	kg Zn
Total Calcium (Ca)	mg/kg	12535	2.73	kg Ca

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : DUNMURRAY

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156249

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
Total Calcium (Ca)	mg/kg	12535
E Coli [Fresh]	cfu/g	1500
Conductivity 1:6 [Fresh]	uS/cm	1854
Total Iron (Fe)	mg/kg	45092
Total Molybdenum (Mo)	mg/kg	4.07
Total Manganese (Mn)	mg/kg	362
Total Lead (Pb)	mg/kg	20.3
Total Cadmium (Cd)	mg/kg	0.353
Total Mercury (Hg)	mg/kg	0.640
Total Nickel (Ni)	mg/kg	16.7
Total Chromium (Cr)	mg/kg	23.1
Organic Matter LOI	% w/w	77.7
Lime Equivalent as CaCO3	% w/w	<2
Fluoride [100:1 H2S04 Soluble]	mg/kg	19.8
Total Arsenic (As)	mg/kg	3.53
Total Selenium (Se)	mg/kg	1.02
Total Boron (B)	mg/kg	12.1

WASTE ANALYSIS RESULTS (Imperial Units)

Sample Reference : DUNMURRAY

Sample Matrix : WASTE

The sample submitted was small and made it difficult to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

Laboratory References	
Report Number	22226
Sample Number	156249

Date Received	15-FEB-2024
Date Reported	06-MAR-2024

ANALYTICAL RESULTS *on 'dry matter' basis.*

Determinand	Units	Value
B.O.D. [fresh]	mg/l	32550
Salmonella spp [fresh]	in 25g	Negative
N. V. as CaO equivalents	% w/w	<1

The nutrients in manure are only partially available for plant growth and may or may not be useful. This depends on the time of application but also on the type and form of manure. More detailed information can be obtained from DEFRA RB209.

Total Phosphorous mg/l as P

Lough Neagh Sites	2018	2019	2020	2021	2022	2023	2024	Overall Avg
Aghalee WwTW Inlet					2.60			2.60
Antrim Milltown WwTW Inlet	6.62	6.48					7.40	6.83
Ballyclare WwTW Inlet	8.79							8.79
Ballygawley WwTW Inlet					6.62		5.88	6.25
Ballymena WwTW Inlet	5.83	3.69	4.71	5.51	6.41	6.07	4.64	5.27
Ballyronan WwTW Inlet						7.63	4.82	6.23
Banbridge WwTW Inlet	4.74	4.22	2.26	7.10				4.58
Cabragh WwTW Inlet				7.46	16.00			11.73
Cargan WwTW Inlet	12.60							12.60
Coalisland WwTW Inlet				5.80				5.80
Cookstown WwTW Inlet	10.61	12.43		4.93		3.17		7.79
Creagh WwTW Inlet							6.80	6.80
Derrycrin WwTW Inlet						5.32	3.66	4.49
Derryhale WwTW Inlet					8.80			8.80
Dungannon WwTW Inlet	3.80	4.67	3.59	4.89	4.31	5.34	7.35	4.85
Dunloy WwTW Inlet	4.17				4.50			4.34
Dunnamore WwTW Inlet					12.25		10.90	11.58
Gilford WwTW Inlet					11.00			11.00
Hamiltonsbawn WwTW Inlet				9.61				9.61
Killygonlan WwTW Inlet			5.14	7.80	8.30			7.08
Maghery WwTW Inlet							5.01	5.01
Markethill WwTW Inlet				8.00				8.00
Martinstown WwTW Inlet	6.90							6.90
Mountnorris WwTW Inlet				6.25				6.25
Moy WwTW Inlet			41.64		6.95	5.37		17.99
Pomeroy WwTW Inlet				7.05			5.20	6.13
Roughfort WwTW Inlet							3.75	3.75
Tandragee WwTW Inlet	7.95	8.12	7.84	7.12	11.00	4.00		7.67