

Application for an environmental permit:

Part LPD1 – Application for a deployment

Use this form for deployments for the landspreading of waste where the operator holds a permit for any of the following standard rules:

- SR2010No4 Mobile plant for landspreading (land treatment resulting in agricultural or ecological benefit);
- SR2010No5 Use of mobile plant for land reclamation, restoration or improvement of land;
- SR2010No6 Mobile plant for landspreading of sewage sludge; or a
- Bespoke mobile plant permit for landspreading or land reclamation.

Please check that this is the latest version of the form available from our website.

Please read through this form and the guidance notes that

come with it. All relevant guidance documents can be found on our website.

Where you see the term 'document reference' on the form, give the document references and send the documents with the application form when you've completed it.

Contents

- 1 About the permit
- 2 About you
- 3 Contact details
- 4 About the deployment
- 5 Payment
- 6 Supporting documents
- 7 Data Protection Act 1998
- 8 Confidentiality and national security
- 9 Declaration

1 About the permit

1a Discussions before your application

If you have had discussions with us before your application, give us the case reference or details on a separate sheet.

Case or document reference

1b Permit number

Permit number this application relates to

GP3792SK

1c What type of permit do you want to deploy under? (Please tick)

SR2010No4 Mobile plant for landspreading (land treatment resulting in agricultural or ecological benefit) ☒

SR2010No5 Use of mobile plant for land reclamation, restoration or improvement of land ☐

SR2010No6 Mobile plant for landspreading of sewage sludge ☐

Bespoke mobile plant permit for landspreading or reclamation, restoration or improvement of land ☐

2 About you

Please give us details of the permit holder. For companies, the details must match Companies House.

Organisation name (if relevant)

ByProduct Recovery Ltd

Title

First name

Last name

Address

Control House

| | |
|--------------------|---------------------|
| | A1 Business Park |
| | Knottingley |
| | West Yorkshire |
| Postcode | WF11 0BU |
| Telephone - mobile | 07824 323 318 |
| Telephone - office | 0113 232 2418 |
| Email address | info@4r-group.co.uk |

If you are applying as an organisation of individuals, every partner needs to give us their details, including their title. If necessary, continue on a separate sheet and tell us the reference you have given the sheet.

| | |
|--------------------|--|
| Document reference | |
|--------------------|--|

3 Contact details

Who can we talk to about your application? This can be someone acting as a consultant or 'agent' for you.

| | | |
|--------------------|---|--|
| Title | Mr | |
| First name | Adam | |
| Last name | Stone | |
| Telephone - mobile | 07508 322259 | |
| Telephone - office | | |
| Email address | adam.stone@4r-group.co.uk / info@4r-group.co.uk | |

4 About the deployment

4a Multiple deployments for one area of land

You may spread more than 10 waste streams on the same area of land, provided you submit additional fully completed deployment forms listing the additional wastes. Your benefit statement must take into account the total benefit to the land of all wastes to be spread.

Is this deployment one of a batch (multiple deployments) for the same area of land?

No ☒ *Go to section 4b*

Yes ☐ How many deployments are in the batch?

4b Nominated competent person

4b1 Give us details of the nominated competent person. This is the person who will be responsible for compliance with the permit for this deployment. See the guidance notes on LPD1 for further details.

| | | |
|------------|---------|--|
| Title | Mr | |
| First name | Richard | |
| Last name | Evans | |

| | |
|--------------------|--|
| Telephone - mobile | 07506 672839 |
| Telephone - office | |
| Email address | richard.evans@4r-group.co.uk / info@4r-group.co.uk |

4b2 What evidence are you using to show the nominated competent person has suitable technical skills and knowledge to manage the activity?

An approved technical scheme ☐ *Go to section 4b3*

Documented in-house training ☒ You must provide evidence – see below.

You must provide evidence to show the documented in-house training meets the requirements set out in technical guidance. See the guidance notes on LPD1 for further details and give us the document reference.

| | | |
|--------------------|--|-------------------------|
| Document reference | 4R Training Certificate Waste to Land - RE | <i>Go to section 4c</i> |
|--------------------|--|-------------------------|

4b3 Which approved scheme are you using to show you have the suitable technical skills and knowledge to manage your facility?

CIWM / WAMITAB ☐

ESA / EU ☐

4b4 Tick to confirm you've included all original *and* continuing competence evidence. ☐

4c Which risk band does the activity fall within?

Please complete Table 1 below to indicate which risk band your activity falls within. This is a combination of waste types and proximity to sensitive receptors.

Once you have selected the risk band your activity falls within, the form guidance tells you what additional information you need to send with the application.

The risk banding affects the fee you need to send with your deployment application. See section 6.

| Table 1 – risk band | | | |
|--|---|---|---|
| Permit type | Lower risk location | | High risk location |
| | - Not in an SPZ 2, and/or - Over 500 meters from: • European site, and/or • Ramsar, and/or • SSSI | | - In a Source Protection Zone 2, and/or - 500 meters or less from: • European site, and/or • Ramsar, and/or • SSSI You must submit a site specific risk assessment. |
| SR2010No4 List A wastes (Lower risk) | Low risk deployment <input type="checkbox"/> | | Medium risk (2) deployment <input type="checkbox"/> |
| SR2010No4 List B wastes (Higher risk) | Medium risk (1) deployment <input checked="" type="checkbox"/> | | High risk deployment <input type="checkbox"/> |
| SR2010No5 (Any waste listed) | Medium risk (1) deployment <input type="checkbox"/> | | High risk deployment <input type="checkbox"/> |
| SR2010No6 (Any waste listed) | Medium risk (1) deployment <input type="checkbox"/> | | High risk deployment <input type="checkbox"/> |
| Bespoke mobile plant permit | Low risk deployment <input type="checkbox"/> | Medium risk deployment <input type="checkbox"/> | High risk deployment <input type="checkbox"/> |

4d Additional information on sensitive receptors

Is the deployment within an SPZ 2 and/or 500m of a European site, Ramsar or SSSI, or being made under a

bespoke permit?

No ☒

Yes ☐ You must submit a site specific risk assessment (see question 4e).

4e Site specific risk assessment

Your site specific risk assessment must show how you intend to prevent any harm to any SPZ 2, European site, Ramsar or SSSI. For more information on risk-assessment please see the accompanying guidance to LPD1 and Technical Guidance Note 'TGN 8.01'.

Please tick a box below to indicate which type of risk-assessment you have submitted.

I have attached a site-specific risk-assessment as the deployment is within and SPZ 2 and/or 500m of a European site, Ramsar or SSSI. I have also addressed risks to other receptors in the risk assessment ☐

I am not within an SPZ 2 and/or 500 m of a European site, Ramsar or SSSI but have addressed risks to other receptors in my benefit statement. ☒

I am deploying under a bespoke permit and have attached a site-specific risk assessment (regardless of location). ☐

4f About the waste

Please list all the individual waste streams you want to spread/use under this deployment, in Table 2 below. We've included an example to help you.

Please note: You can only spread/use 10 waste types per deployment.

| Table 2 – waste types | | | | | |
|-----------------------|------------------------------|--------------------------------|---------------|---------------------|---|
| | List of Waste code (6 digit) | Waste description | Physical form | Waste producer | Total amount being spread/used (tonnes) |
| e.g. | 03 03 05 | De-inked paper | Sludge | Smith's Newsprint | 500 |
| 1 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Bolton Hill | 11725 |
| 2 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Bontgoch | 9237 |
| 3 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Bryngwyn | 12500 |
| 4 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Capel Dewi | 12500 |
| 5 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Cefn Dryskoed | 11725 |
| 6 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Crai | 12500 |
| 7 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Hirwaun | 12500 |
| 8 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Llechryd | 11097 |
| 9 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Preseli | 11725 |
| 10 | 19 09 02 | Potable water treatment sludge | Liquid sludge | DCWW Strata Florida | 7990 |
| Total tonnage | | | | | 12500 |

4g About the land you want to treat

4g1 Please give details of the main address of the land to be treated.

| | |
|------------------------------------|-----------------|
| Address | Tyncwm |
| | Llansawel |
| | Llandeilo |
| | Carmarthenshire |
| Postcode | SA19 7PQ |
| National grid reference (12 digit) | SN 63494 35562 |

4g2 What type of land do you want to treat?

| | | | |
|-----------------------|-------------------------------------|---|-------------|
| Agricultural land | <input checked="" type="checkbox"/> | Please give your County/ Parish/ Holding number | 55/052/0003 |
| Non-agricultural land | <input type="checkbox"/> | | |

4h The parcels of land you want to treat

Please list all the individual areas (parcels) of land you want to include this deployment, in Table 3 below.

Please note: the total area to be treated must not be more than 50 hectares.

| Table 3 – parcels of land | | | | |
|---------------------------|-------------------------------|---|---|-----------------|
| | Field name/ number/ reference | Grid reference - centre of field (12 digit) | Waste types to be spread/used (List of Waste code) Separate using commas. | Size (hectares) |
| 1 | Please refer to LPD1 | | | |
| 2 | Supplement | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| Total hectares | | | | |

4i Is the permit holder the owner or occupier of the land you want to spread on/treat?

Yes ☐ Go to section 4k

No ☒ You must give us details of the land owner or occupier, below.

| | |
|---------------------------------|-------|
| Organisation name (if relevant) | |
| Title | Mrs |
| First name | S M |
| Last name | Speke |

| | |
|--------------------|-----------------|
| Address | Tyncwm |
| | Llansawel |
| | Llandeilo |
| | Carmarthenshire |
| Postcode | SA19 7PQ |
| Telephone - mobile | |
| Telephone - office | 01558 685244 |
| Email address | |

If there is more than one owner or occupant for the area covered by this deployment, you must give us details of each. Please continue on a separate sheet and tell us the reference you have given the sheet.

| | |
|--------------------|--|
| Document reference | |
|--------------------|--|

4j Do you have the consent of the owner or occupier to carry out the activity?

Yes ☒ Go to section 4k

No ☐ You must tell us why you think you can carry out the activity without the consent of the occupier. Please give an explanation in the box, below. Continue on a separate sheet if needed.

| Explanation |
|-------------|
| |

4k Previous land treatment

Has any of the land listed in Table 3 been treated with other wastes, sewage sludge, slurries or manures etc. in the last 12 months?

No ☒ Go to section 4l

Yes ☐ You must give us details in Table 4 below *and* account for them in your benefit statement.

| Table 4 – previous land treatment | | | | | |
|-----------------------------------|-------------------------------|---|--------------------------------------|---|--|
| | Field name/ number/ reference | Describe the waste spread (in last 12 months) | Person/ company who spread the waste | Quantity spread per hectare (in tonnes) | Deployment/ other reference (if known) |
| e.g. | East field | Digested sewage sludge cake | Eastern Waters | 20 | PAN 000000 |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |

| | | | | | |
|----|--|--|--|--|--|
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

4I Waste storage

Are you proposing to store waste in connection with this deployment?

No ☐ *Go to section 5*

Yes ☒ You must give us details in Table 5 below.

Table 5 – waste storage details

| | Grid reference (12 digit) | Waste type being stored (6 digit List of Waste code) | Storage method | Quantity stored at any one time (in tonnes) |
|----|---------------------------|--|----------------------------|---|
| 1 | SN 63562 35540 | 19 09 02 | Above ground storage tank | 1250 |
| 2 | SN 63574 35581 | 19 09 02 | Nurse tank | 1250 |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | No more than 1250t shall | be stored across all storage | locations at any one time. | |
| 10 | | | | |

5 Payment

5a Tick an option below to show how you will pay for the application.

Electronic transfer (for example, BACS) ☒ *Go to section 5b*

Cheque ☐ *Go to section 5c*

Postal order ☐ *Go to section 5d*

Credit or debit card ☐ *Go to section 5e*

5b Paying by electronic transfer

If you choose to pay by electronic transfer use the following information to make your payment.

Company name: Natural Resources Wales

Company address: Income Dept., PO BOX 663, Cardiff, CF24 0TP

Bank: RBS

Address: National Westminster Bank Plc, 2 ½ Devonshire Square, London, EC2M 4BA

Sort code: 60-70-80
Account number: 10014438

Reference number

You can use any reference number but we prefer the number to be 'EPDEP' followed by the first five letters of your organisation name followed by a four-digit number.

For example, for a company named Joe Bloggs Ltd, the reference number might be EPDEPJOEBL0001. (Remember you can use any four-digit number at the end.)

The reference number you will provide will appear on our bank statements so we can check your payment. We may need to contact your bank to make sure the reference number is quoted correctly.

You should also email your payment details and payment reference number to banking.team@naturalresourceswales.gov.uk / banking.team@cyfoethnaturiolcymru.gov.uk or fax it to 0300 065 3001 and enter it in the space provided below.

| | |
|----------------|--|
| BACS reference | <input type="text" value="PSCAPPBYPRO0762"/> |
| Amount paid | <input type="text" value="£798"/> |

Making payments from outside the UK

These details have changed. If you are making your payment from outside the United Kingdom (which must be received in sterling), our IBAN number is GB70 NWBK6070 8010 0144 38 and our SWIFT/BIC number is NWBKGB2L.

If you do not quote your payment reference number, there may be a delay in processing your payment and application.

5c Paying by cheque or postal order

You should make cheques or postal orders payable to Natural Resources Wales and they should be marked 'A/c Payee'. We will not accept post-dated cheques (cheques with a future date written on them).

| | |
|-----------------------------|----------------------|
| Cheque/ postal order number | <input type="text"/> |
| Amount paid | <input type="text"/> |

5d Paying by credit or debit card

If you are paying by credit or debit card, please fill in the separate form CC1.

You can download this from our Website or you can ask for one of our customer service providers to send one by post. We will destroy your card details once we have processed your payment. We can accept payments by Visa, MasterCard or Maestro UK card only.

6 Supporting documents

You must provide all relevant documents to support your application. The information we need depends on the type of deployment application you're making. If you don't provide us with all the information we need, we won't be able to assess your proposal and the application may be rejected.

Better quality deployments result in shorter processing times. If we don't need to come back to you for more information, we'll be able to give you a decision quicker.

6a What supporting evidence do you need to send?

Are you applying to spread/use waste under a SR2010 No4 standard rule set permit?

- Yes ☒ Complete the checklist in Table 6 *and* Table 7 Go to section 6b
- No ☐ Complete the checklist in Table 7 only. Go to section 6c

6b Checklist for deployments under SR2010 No4 only

Complete the checklist in Table 6, below. Tick to confirm you've completed the action.

| Table 6 | |
|---|-------------------------------------|
| Do the grid references (for fields and storage areas) match the map locations? | <input checked="" type="checkbox"/> |
| Are the grid references in the correct format i.e. AB 12345 67890? | <input checked="" type="checkbox"/> |
| Have details of previous land treatment been provided? | <input checked="" type="checkbox"/> |
| Have you included a location map? | <input checked="" type="checkbox"/> |
| Does the map include all the relevant features as set out in the guidance? | <input checked="" type="checkbox"/> |
| Have you included a waste analysis? | <input checked="" type="checkbox"/> |
| Is the waste analysis for each waste less than 12 months old? | <input checked="" type="checkbox"/> |
| Does the waste analysis include pH, Nitrogen (N), Phosphorus (P), Potassium (K), % dry matter and Potentially Toxic Elements (PTE's)? | <input checked="" type="checkbox"/> |
| Have you included a soil analysis? | <input checked="" type="checkbox"/> |
| Is the soil analysis less for each field than 4 years old? | <input checked="" type="checkbox"/> |
| Does the soil analysis provide the soil pH, Potassium (K), Phosphorus (P), Magnesium (Mg) and PTEs if they are high in the waste? | <input checked="" type="checkbox"/> |
| Have the soil indices for P, K and Mg for each field been provided? | <input checked="" type="checkbox"/> |
| Have you included a Certificate of Agricultural Benefit? | <input checked="" type="checkbox"/> |
| Has the proposed cropping regime been stated? | <input checked="" type="checkbox"/> |
| Has the waste application rate been stated? | <input checked="" type="checkbox"/> |
| Has the timing of application been stated and is it appropriate for the cropping regime? | <input checked="" type="checkbox"/> |
| Has the intended method of waste application been stated? | <input checked="" type="checkbox"/> |
| Have the total nutrients supplied by the waste been stated and have they been provided in oxide format? | <input checked="" type="checkbox"/> |
| Has the nutrient requirement for the proposed crop been provided? | <input checked="" type="checkbox"/> |
| Has the soil nitrogen supply (SNS) for each field been provided? | <input checked="" type="checkbox"/> |
| If the land has been treated with other wastes, sewage sludge, slurries manures etc. in the last 12 months, has relevant information been provided? | <input checked="" type="checkbox"/> |
| If more than one waste stream is to be applied to the land; has the benefit for each individual waste stream been demonstrated? | <input checked="" type="checkbox"/> |
| Have you included a site specific risk assessment? (where relevant) | <input type="checkbox"/> |
| Does the Site Specific Risk Assessment; consider all potential receptors, identify all risks from the activity, and include information on all measures you'll use to minimise or mitigate the impact and why they're suitable. | <input type="checkbox"/> |

6c Checklist for all types of deployment application.

Complete the checklist in Table 7, below. Tick to confirm you've completed the action.

| Table 7 | | |
|--|-------------------------------------|---|
| Item | Complete | Your document reference/ description |
| Location map (required for all deployments) | <input checked="" type="checkbox"/> | T Map |
| Benefit statement (required for all deployments) | <input checked="" type="checkbox"/> | T ABS |
| Waste analysis (required for all deployments) | <input checked="" type="checkbox"/> | Waste Analysis |

| | | |
|--|-------------------------------------|--|
| Receiving soil analysis (required for all deployments) | <input checked="" type="checkbox"/> | Soil Analysis |
| Site-specific risk assessment (in accordance with 4e) | <input type="checkbox"/> | |
| Any other additional information | N/A | LPD1 Supplement |
| | N/A | 4R Training Certificate Waste to Land - RE |
| | N/A | |
| | N/A | |

7 The data Protection Act 1998

We, the Natural Resources Body for Wales (hereafter “Natural Resources Wales”), will process the information you provide so that we can:

- deal with your application;
- make sure you keep to the conditions of the licence, permit or registration;
- process renewals; and
- keep the public registers up to date.

We may also process or release the information to:

- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment, Food and Rural Affairs) on environmental issues;
- carry out research and development work on environmental issues;
- provide information from the public register to anyone who asks;
- prevent anyone from breaking environmental law, investigate cases where environmental law may have been broken, and take any action that is needed;
- assess whether customers are satisfied with our service, and to improve our service; and
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004 (if the Data Protection Act allows).

We may pass the information on to our agents or representatives to do these things for us.

8 Confidentiality and national security

We will normally put all the information in your application on a public register of environmental information. However, we may not include certain information in the public register if this is in the interests of national security, or because the information is confidential.

You can ask for information to be made confidential by ticking the box below and enclosing a letter with your application giving your reasons. If we agree with your request, we will tell you and not include the information in the public register. If we do not agree with your request, we will let you know how to appeal against our decision, or you can withdraw your application.

Please treat the information in my application as confidential.

☐

You can tell the Secretary of State that you believe including information on a public register would not be in the interests of national security. You must enclose a letter with your application telling us that you have told the Welsh Ministers and you must still include the information in your application. We will not include the information in the public register unless the Welsh Ministers decides that it should be included.

Only tick the box below if you are certain that you wish to claim confidentiality or national security for your application. This may delay your application.

I attach a letter stating that I have written to the Welsh Ministers explaining why my information should not be included on the public register for national security reasons

☐

9 Declaration

You must read this section before making the declaration and sending your form to us.

A relevant person should make the declaration. You must be a relevant person or have the authority of a relevant person to sign this application on their behalf.

Relevant people means each applicant, and in the case of a company, a director, manager, company secretary or any similar officer or employee listed on current appointments in Companies House. In the case of a Limited Liability Partnership (LLP), it includes any partner. If the permit holder is an organisation of individuals, each individual (or individual trustee) must complete the declaration.

To simplify and speed up the application process we recommend that the declaration is filled in by an officer of a company or one of the partners in a Limited Liability Partnership (LLP).

If you wish a manager, employee or consultant etc. to sign the declaration on behalf of a relevant person, we will need written confirmation from a relevant person; that is, an officer of the company, a partner in the LLP or the individual, confirming that the person has the authority to fill in the declaration.

If you are joint permit holders you should each fill in your own declaration. We have provided a separate sheet for this.

Where the operator is the subject of any insolvency procedure, the declaration must be filled in by the official receiver/appointed insolvency practitioner.

9a Are you signing the form on *behalf* of a relevant person?

If you are *not* a relevant person, but want to sign the application on their behalf, you must include confirmation that you can do this.

I have included written confirmation from a relevant person to confirm I can sign on their behalf. ☐

9b Does your deployment application relate to a standard facility permit?

If your deployment application is being made in relation to a standard facility permit (SRP), you also need to confirm that you are able to meet all relevant criteria of the standard rule set/sets under which you are applying.

I confirm that my activity/activities will fully meet the rules of the permit deployment I have applied for. ☐

9c Sign to confirm you understand the declaration.

If you knowingly or recklessly make a statement which is false or misleading to help you get an environmental permit (for yourself or another person), you are committing an offence under the Environmental Permitting (England and Wales) Regulations 2016.

I declare that the information in this application is true to the best of my knowledge and belief. I understand that this application may be refused or approval withdrawn if I give false or incomplete information.

I understand that if I knowingly or recklessly make a false or misleading statement:

- I may be prosecuted; and
- if convicted, I may have to pay a fine and/or go to prison.

By signing below, you are confirming that you understand and agree with the declaration above.

| | | |
|----------------------------|------------|--|
| Title | Mr | |
| First name | Jon | |
| Last name | Smith | |
| On behalf of (if relevant) | | |
| Today's date (DD/MM/YYYY) | 19/03/2020 | |

LPD1 Supplement

4h The parcels of land you want to treat.

| Table 3 – parcels of land | | | | |
|---------------------------|-------------------------------------|--|--|--------------------|
| | Field name/ number/ reference | Grid reference – centre of field (12 digit) | Waste types to be spread/used (List of waste code) separate using commas | Size (hectares) |
| 1 | 1 | SN 63039 35304 | 19 09 02 | 10.22 |
| 2 | 2 | SN 63294 35435 | 19 09 02 | 3.56 |
| 3 | 3 | SN 63239 35178 | 19 09 02 | 4.13 |
| 4 | 4 | SN 63427 35337 | 19 09 02 | 3.55 |
| 5 | 5A | SN 63261 34953 | 19 09 02 | 6.82 |
| 6 | 5B | SN 63486 35130 | 19 09 02 | 6.82 |
| 7 | 6 | SN 63586 35282 | 19 09 02 | 1.58 |
| 8 | 7 | SN 63588 35452 | 19 09 02 | 3.25 |
| 9 | 9 | SN 63739 35341 | 19 09 02 | 2.30 |
| 10 | 10 | SN 63661 35585 | 19 09 02 | 3.10 |
| 11 | 11 | SN 63810 35493 | 19 09 02 | 2.43 |
| 12 | 12 | SN 63728 35704 | 19 09 02 | 2.24 |
| | | | Total | 50.00 |

Continuation of T ABS, Section 4.3, Table 5, *Are there land drains in the field?*

There was a dry land drain connecting the farmyard to a hedge line in field 7 as shown in the screenshot below:



This land drain has recently been piped and filled in so is no longer an open watercourse. Please see photos below showing the new structure:



Photo 1 showing new outlet over 20m from above ground storage tank



Photo 2 showing where the land drain used to be



Location Plan Tyncwm

Sites:

Tyncwm
B4337
Llansawel
Llandeilo
Carmarthenshire
SA19 7PQ

Client:

Dŵr Cymru / Welsh Water

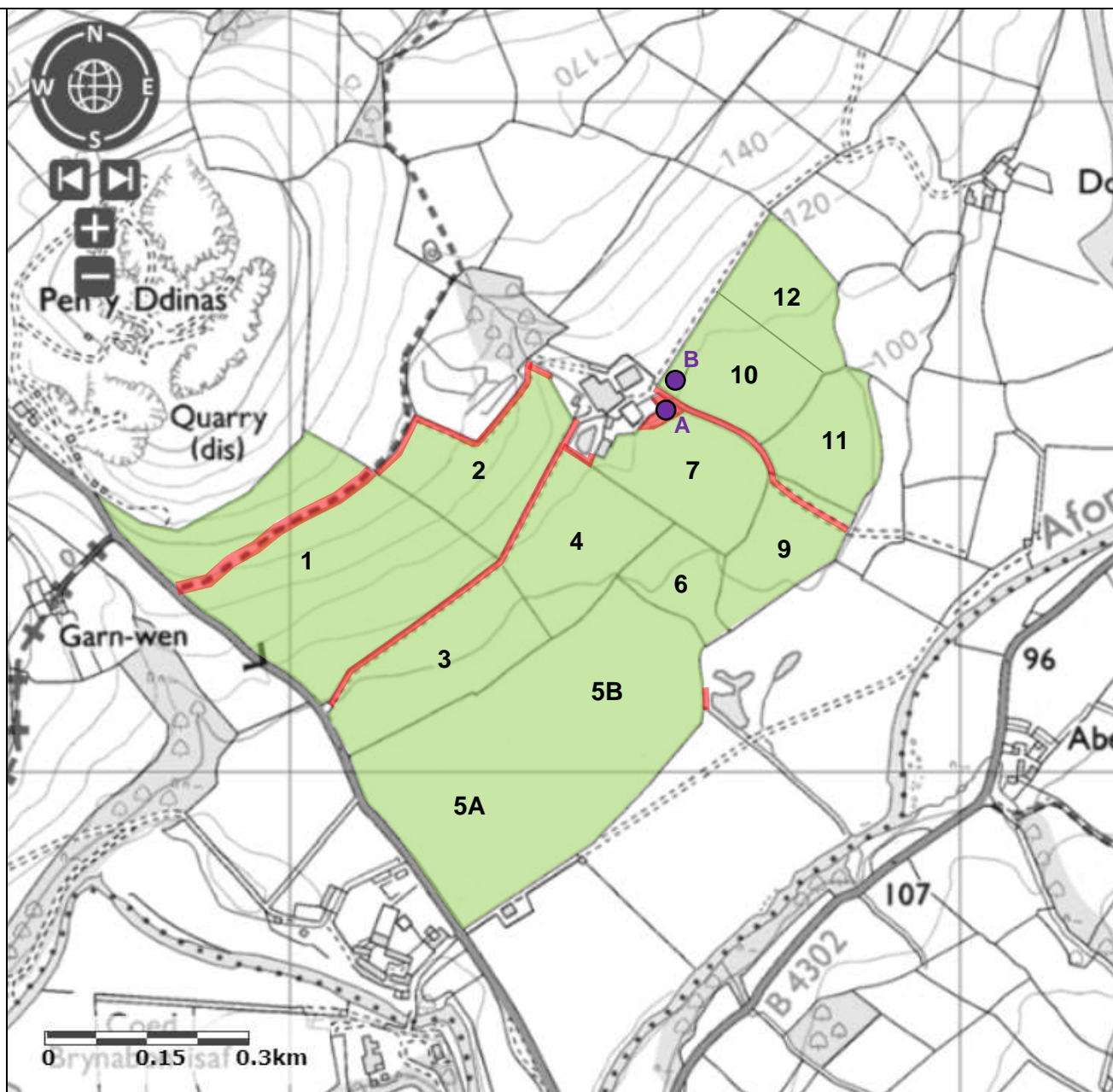
Key:

-  Spreading area
-  Non-spreading area
-  Location tags

Location tags:

Above ground storage tank
A. SN 63562 35540

Nurse tank
B. SN 63574 35581



Agricultural Benefit Statement

For the application of beneficial wastes to fields at;

Tyncwm, B4337, Llansawel, Llandeilo, Carmarthenshire. SA19 7PQ

19th March 2020

1 Person with appropriate technical expertise and permit details

This benefit statement has been compiled by Adam Stone (Consultant at 4R Group) who has the following qualifications and experience;

- MSc Geoenvironmental Engineering
- BSc (Hons) Physical Geography
- AssocMCIWM
- FACTS Qualified Advisor (No. FE/6321) and Full Member of BASIS Professional Register

Verified by; Chris Ash FQA (FE/6324)

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

2 Where the waste is to be spread

Table 1. Where the waste is to be spread

| | | |
|---|--|-----------------------|
| <i>Farm address:</i> | Tyncwm, B4337, Llansawel, Llandeilo, Carmarthenshire. SA19 7PQ | |
| <i>Stockpile grid reference:</i> | Please refer to table 4. | |
| <i>Area of the receiving land:</i> | 50ha | |
| <i>Quantity to be stored at any one time:</i> | Stackable (temporary field stockpile): N/A | Non-Stackable: 1,250t |
| <i>Total maximum quantity to be spread:</i> | 12,500t | |
| <i>Location map document reference:</i> | T Map | |

3 What is the waste to be spread

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

| Waste | EWC Code | Description | Waste Producer | Additional Information |
|--------------|-----------------|---|-----------------------|------------------------------------|
| 1 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Bolton Hill | Non-stackable alum liquid sludge |
| 2 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Bontgoch | Non-stackable alum liquid sludge |
| 3 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Bryngwyn | Non-stackable ferric liquid sludge |
| 4 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Capel Dewi | Non-stackable ferric liquid sludge |
| 5 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Cefn Dryskoed | Non-stackable alum liquid sludge |
| 6 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Crai | Non-stackable ferric liquid sludge |
| 7 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Hirwaun | Non-stackable ferric liquid sludge |
| 8 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Llechryd | Non-stackable ferric liquid sludge |
| 9 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Preseli | Non-stackable alum liquid sludge |
| 10 | 19 09 02 | Sludges from water clarification. Potable water treatment effluent. | DCWW Strata Florida | Non-stackable alum liquid sludge |

4 Operational details

4.1 Cropping details

Table 3. Cropping details

| | |
|---|---|
| <i>Current crop including projected yield if known:</i> | Refer to tables 6-15 |
| <i>Is straw removed?</i> | Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/> |

| | |
|---|--|
| <i>Following crop and any sensitive crops within rotation which you are amending the soil for in good time:</i> | Refer to tables 6-15 |
| <i>When do you intend to apply this waste; e.g. post harvest – pre-ploughing, during seed bed cultivations, on the stubble over winter:</i> | <p>Spreading will only take place subject to ground conditions and following the Code of Good Agricultural Practice (Defra, 2011), NVZ regulations and the permit holder's Environmental Management System (EMS).</p> <p>Targeted periods of spreading on grass fields include spring, and after cutting of silage through summer and autumn.</p> <p>No more than 50t/ha of liquid sludge will be spread on a field in any 3-week period in accordance with CoGAP, and no more than 250t/ha will be spread within any 12-month period.</p> |

4.2 Waste storage

Table 4. Waste storage

| | |
|--|--|
| <i>How is the waste to be stored?</i> <i>e.g. mobile tank, field heap, spread on delivery</i> | <p>Stackable: N/A</p> <p>Non-stackable wastes: Above the ground storage tank / nurse tank in fields 10</p> |
| <i>Where is the waste to be stored prior to spreading?</i> | <p>A. SN 63562 35540 (above the ground storage tank)</p> <p>B. SN 63574 35581 (nurse tank)</p> |
| <i>Why were these storage locations chosen?</i> | <p>The storage locations are accessible by delivery vehicle near field entrances so the potential damage to fields by delivering vehicles is minimal.</p> <p>The storage locations are not within 10m of any ditch, watercourse, or footpath, nor within an SPZ1, and are at least 50m from any well spring or borehole. They are also a safe distance from overhead powerlines.</p> |

4.3 Waste application

Table 5. Waste application

| | |
|---|--|
| <i>How is the waste to be spread and why is it to be spread that way?</i> | Liquid sludges will be surface spread by tractor and either an umbilical system or tanker, using a dribble bar. An umbilical system or tanker will be used depending on which is better practicable on each field. |
| <i>How do you plan to incorporate the waste following application?</i> | There is no requirement for further incorporation of wastes on grass fields due to low ammonia content and minimal odour. |

| | |
|---|---|
| <p><i>With liquid wastes is there any mole draining or sub-soiling planned?</i></p> <p><i>Are there land drains in the field?</i></p> | <p>No mole draining, or sub soiling planned.</p> <p>There was a land drain in the northeast corner of field 7 but this has since been piped and filled in so is no longer an open watercourse.</p> |
| <p><i>Other relevant operational information:</i></p> | <p>The wastes may be applied separately or in combination. If the wastes are applied in combination the total combined amount applied will not exceed 250t/ha, the total nitrogen loading will be less than 250kg/ha, and the amount of available nitrogen and total or available phosphate and potash (whichever is appropriate) will not exceed the fertiliser recommendation or the amount removed in crop offtake, whichever is the greater.</p> <p>All fields except field 10 are above pH 6 so alum based DCWW sludge can be spread on these fields. Field 10 will not receive alum based sludge. Ferric based material will be delivered straight to the nurse tank.</p> |

Table 6. DCWW Bolton Hill

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-------|-------|-------|-------------------------------|-------|-------|--------|------------------|-------|-------|--------|-------|-------|-------|------|--------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | In | | | P Ind | Crop | | In Wst | K Ind | Crop | | In Wst | Mg | | | Rate | Totals |
| | | | | | | SNS | Req | Wst | | Req | Use | | | Req | Use | | Ind | Req | Wst | | |
| | | | | | | kg/ha | kg/ha | kg/ha | | kg/ha | kg/ha | | | kg/ha | kg/ha | | kg/ha | kg/ha | kg/ha | | |
| 1 | 10.90 | 10.20 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **46 | 1 | 285 | 248 | 1.9 | 2 | 0 | 4.1 | 250 | 2550 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 3 | 20 | 75 | **46 | 2- | 230 | 248 | **9.7 | 2 | 0 | 4.1 | 250 | 890 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 2 | 75 | 75 | **46 | 0 | 350 | 248 | 1.9 | 5 | 0 | 4.1 | 250 | 1033 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **46 | 3 | 70 | 248 | **9.7 | 3 | 0 | 4.1 | 250 | 888 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 2 | 75 | 75 | **46 | 0 | 350 | 248 | 1.9 | 2 | 0 | 4.1 | 250 | 1705 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 3 | 20 | 75 | **46 | 0 | 350 | 248 | 1.9 | 2 | 0 | 4.1 | 250 | 1705 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 3 | 20 | 75 | **46 | 1 | 285 | 248 | 1.9 | 3 | 0 | 4.1 | 250 | 395 |
| 7 | 3.48 | 3.27 | Grass | Grass | 6.6 | Mod | 235 | 1.5 | 2 | 75 | 75 | **46 | 1 | 285 | 248 | 1.9 | 2 | 0 | 4.1 | 250 | 818 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 1 | 120 | 75 | 9.3 | 1 | 285 | 248 | 1.9 | 2 | 0 | 4.1 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | | 2 | 75 | 75 | | 0 | 350 | 248 | | 2 | 0 | | | |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 1 | 120 | 75 | 9.3 | 1 | 285 | 248 | 1.9 | 2 | 0 | 4.1 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 2 | 75 | 75 | **46 | 3 | 70 | 248 | **9.7 | 3 | 0 | 4.1 | 250 | 560 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 11725 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 71kg/ha

Table 7. DCWW Bontgoch

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|-----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Req kg/ha | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 3.7 | 3 | 20 | 75 | **75 | 1 | 285 | 248 | 0.3 | 2 | 0 | 1.0 | 191 | 1952 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 3.7 | 3 | 20 | 75 | **75 | 2- | 230 | 248 | **1.7 | 2 | 0 | 1.0 | 191 | 680 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 3.7 | 2 | 75 | 75 | **75 | 0 | 350 | 248 | 0.3 | 5 | 0 | 1.0 | 191 | 789 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 3.7 | 3 | 20 | 75 | **75 | 3 | 70 | 248 | **1.7 | 3 | 0 | 1.0 | 191 | 678 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 3.7 | 2 | 75 | 75 | **75 | 0 | 350 | 248 | 0.3 | 2 | 0 | 1.0 | 191 | 1303 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 3.7 | 3 | 20 | 75 | **75 | 0 | 350 | 248 | 0.3 | 2 | 0 | 1.0 | 191 | 1303 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 3.7 | 3 | 20 | 75 | **75 | 1 | 285 | 248 | 0.3 | 3 | 0 | 1.0 | 191 | 302 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 3.7 | 2 | 75 | 75 | **75 | 1 | 285 | 248 | 0.3 | 2 | 0 | 1.0 | 191 | 621 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 4.9 | 1 | 120 | 75 | 20 | 1 | 285 | 248 | 0.4 | 2 | 0 | 1.3 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | | 2 | 75 | 75 | | 0 | 350 | 248 | | 2 | 0 | | | |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 4.9 | 1 | 120 | 75 | 20 | 1 | 285 | 248 | 0.4 | 2 | 0 | 1.3 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 3.7 | 2 | 75 | 75 | **75 | 3 | 70 | 248 | **1.7 | 3 | 0 | 1.0 | 191 | 428 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 9237 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 144kg/ha

Table 8. DCWW Bryngwyn

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Crop Req | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **9.7 | 1 | 285 | 248 | 0.2 | 2 | 0 | 1.1 | 250 | 2555 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 3 | 20 | 75 | **9.7 | 2- | 230 | 248 | **1.0 | 2 | 0 | 1.1 | 250 | 890 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 2 | 75 | 75 | **9.7 | 0 | 350 | 248 | 0.2 | 5 | 0 | 1.1 | 250 | 1033 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **9.7 | 3 | 70 | 248 | **1.0 | 3 | 0 | 1.1 | 250 | 888 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 2 | 75 | 75 | **9.7 | 0 | 350 | 248 | 0.2 | 2 | 0 | 1.1 | 250 | 1705 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 3 | 20 | 75 | **9.7 | 0 | 350 | 248 | 0.2 | 2 | 0 | 1.1 | 250 | 1705 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 3 | 20 | 75 | **9.7 | 1 | 285 | 248 | 0.2 | 3 | 0 | 1.1 | 250 | 395 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 1.5 | 2 | 75 | 75 | **9.7 | 1 | 285 | 248 | 0.2 | 2 | 0 | 1.1 | 250 | 813 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 1 | 120 | 75 | 1.9 | 1 | 285 | 248 | 0.2 | 2 | 0 | 1.1 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | 1.5 | 2 | 75 | 75 | **9.7 | 0 | 350 | 248 | 0.2 | 2 | 0 | 1.1 | 250 | 775 |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 1 | 120 | 75 | 1.9 | 1 | 285 | 248 | 0.2 | 2 | 0 | 1.1 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 2 | 75 | 75 | **9.7 | 3 | 70 | 248 | **1.0 | 3 | 0 | 1.1 | 250 | 560 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 12500 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 33kg/ha

Table 9. DCWW Capel Dewi

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|-----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Req kg/ha | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **22 | 1 | 285 | 248 | 0.8 | 2 | 0 | 2.1 | 250 | 2555 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 3 | 20 | 75 | **22 | 2- | 230 | 248 | **4.2 | 2 | 0 | 2.1 | 250 | 890 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 2 | 75 | 75 | **22 | 0 | 350 | 248 | 0.8 | 5 | 0 | 2.1 | 250 | 1033 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **22 | 3 | 70 | 248 | **4.2 | 3 | 0 | 2.1 | 250 | 888 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 2 | 75 | 75 | **22 | 0 | 350 | 248 | 0.8 | 2 | 0 | 2.1 | 250 | 1705 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 3 | 20 | 75 | **22 | 0 | 350 | 248 | 0.8 | 2 | 0 | 2.1 | 250 | 1705 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 3 | 20 | 75 | **22 | 1 | 285 | 248 | 0.8 | 3 | 0 | 2.1 | 250 | 395 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 1.5 | 2 | 75 | 75 | **22 | 1 | 285 | 248 | 0.8 | 2 | 0 | 2.1 | 250 | 813 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 1 | 120 | 75 | 4.4 | 1 | 285 | 248 | 0.8 | 2 | 0 | 2.1 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | 1.5 | 2 | 75 | 75 | **22 | 0 | 350 | 248 | 0.8 | 2 | 0 | 2.1 | 250 | 775 |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 1 | 120 | 75 | 4.4 | 1 | 285 | 248 | 0.8 | 2 | 0 | 2.1 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 2 | 75 | 75 | **22 | 3 | 70 | 248 | **4.2 | 3 | 0 | 2.1 | 250 | 560 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 12500 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 54kg/ha

Table 10. DCWW Cefn Dryskoed

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|-----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Req kg/ha | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 6.3 | 3 | 20 | 75 | **11 | 1 | 285 | 248 | 1.0 | 2 | 0 | 1.0 | 250 | 2555 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 6.3 | 3 | 20 | 75 | **11 | 2- | 230 | 248 | **5.0 | 2 | 0 | 1.0 | 250 | 890 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 6.3 | 2 | 75 | 75 | **11 | 0 | 350 | 248 | 1.0 | 5 | 0 | 1.0 | 250 | 1033 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 6.3 | 3 | 20 | 75 | **11 | 3 | 70 | 248 | **5.0 | 3 | 0 | 1.0 | 250 | 888 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 6.3 | 2 | 75 | 75 | **11 | 0 | 350 | 248 | 1.0 | 2 | 0 | 1.0 | 250 | 1705 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 6.3 | 3 | 20 | 75 | **11 | 0 | 350 | 248 | 1.0 | 2 | 0 | 1.0 | 250 | 1705 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 6.3 | 3 | 20 | 75 | **11 | 1 | 285 | 248 | 1.0 | 3 | 0 | 1.0 | 250 | 395 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 6.3 | 2 | 75 | 75 | **11 | 1 | 285 | 248 | 1.0 | 2 | 0 | 1.0 | 250 | 813 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 6.3 | 1 | 120 | 75 | 2.3 | 1 | 285 | 248 | 1.0 | 2 | 0 | 1.0 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | | 2 | 75 | 75 | | 0 | 350 | 248 | | 2 | 0 | | | |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 6.3 | 1 | 120 | 75 | 2.3 | 1 | 285 | 248 | 1.0 | 2 | 0 | 1.0 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 6.3 | 2 | 75 | 75 | **11 | 3 | 70 | 248 | **5.0 | 3 | 0 | 1.0 | 250 | 560 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 11725 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 50kg/ha

Table 11. DCWW Crai

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|---------|-----------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | *In Req | Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **12 | 1 | 285 | 248 | 0.7 | 2 | 0 | 1.4 | 250 | 2555 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 3 | 20 | 75 | **12 | 2- | 230 | 248 | **3.4 | 2 | 0 | 1.4 | 250 | 890 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 1.5 | 2 | 75 | 75 | **12 | 0 | 350 | 248 | 0.7 | 5 | 0 | 1.4 | 250 | 1033 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 1.5 | 3 | 20 | 75 | **12 | 3 | 70 | 248 | **3.4 | 3 | 0 | 1.4 | 250 | 888 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 2 | 75 | 75 | **12 | 0 | 350 | 248 | 0.7 | 2 | 0 | 1.4 | 250 | 1705 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 3 | 20 | 75 | **12 | 0 | 350 | 248 | 0.7 | 2 | 0 | 1.4 | 250 | 1705 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 1.5 | 3 | 20 | 75 | **12 | 1 | 285 | 248 | 0.7 | 3 | 0 | 1.4 | 250 | 395 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 1.5 | 2 | 75 | 75 | **12 | 1 | 285 | 248 | 0.7 | 2 | 0 | 1.4 | 250 | 813 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 1.5 | 1 | 120 | 75 | 2.4 | 1 | 285 | 248 | 0.7 | 2 | 0 | 1.4 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | 1.5 | 2 | 75 | 75 | **12 | 0 | 350 | 248 | 0.7 | 2 | 0 | 1.4 | 250 | 775 |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 1 | 120 | 75 | 2.4 | 1 | 285 | 248 | 0.7 | 2 | 0 | 1.4 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 1.5 | 2 | 75 | 75 | **12 | 3 | 70 | 248 | **3.4 | 3 | 0 | 1.4 | 250 | 560 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 12500 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 60kg/ha

Table 12. DCWW Hirwaun

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Crop Req | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 5.5 | 3 | 20 | 75 | **6.6 | 1 | 285 | 248 | 0.2 | 2 | 0 | 0.7 | 250 | 2555 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 5.5 | 3 | 20 | 75 | **6.6 | 2- | 230 | 248 | **0.9 | 2 | 0 | 0.7 | 250 | 890 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 5.5 | 2 | 75 | 75 | **6.6 | 0 | 350 | 248 | 0.2 | 5 | 0 | 0.7 | 250 | 1033 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 5.5 | 3 | 20 | 75 | **6.6 | 3 | 70 | 248 | **0.9 | 3 | 0 | 0.7 | 250 | 888 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 5.5 | 2 | 75 | 75 | **6.6 | 0 | 350 | 248 | 0.2 | 2 | 0 | 0.7 | 250 | 1705 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 5.5 | 3 | 20 | 75 | **6.6 | 0 | 350 | 248 | 0.2 | 2 | 0 | 0.7 | 250 | 1705 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 5.5 | 3 | 20 | 75 | **6.6 | 1 | 285 | 248 | 0.2 | 3 | 0 | 0.7 | 250 | 395 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 5.5 | 2 | 75 | 75 | **6.6 | 1 | 285 | 248 | 0.2 | 2 | 0 | 0.7 | 250 | 813 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 5.5 | 1 | 120 | 75 | 1.3 | 1 | 285 | 248 | 0.2 | 2 | 0 | 0.7 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | 5.5 | 2 | 75 | 75 | **6.6 | 0 | 350 | 248 | 0.2 | 2 | 0 | 0.7 | 250 | 775 |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 5.5 | 1 | 120 | 75 | 1.3 | 1 | 285 | 248 | 0.2 | 2 | 0 | 0.7 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 5.5 | 2 | 75 | 75 | **6.6 | 3 | 70 | 248 | **0.9 | 3 | 0 | 0.7 | 250 | 560 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 12500 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 89kg/ha

Table 13. DCWW Llechryd

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Crop Req | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 5.5 | 3 | 20 | 75 | **75 | 1 | 285 | 248 | 2.6 | 2 | 0 | 6.1 | 219 | 2238 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 5.5 | 3 | 20 | 75 | **75 | 2- | 230 | 248 | **13 | 2 | 0 | 6.1 | 219 | 780 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 5.5 | 2 | 75 | 75 | **75 | 0 | 350 | 248 | 2.6 | 5 | 0 | 6.1 | 219 | 904 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 5.5 | 3 | 20 | 75 | **75 | 3 | 70 | 248 | **13 | 3 | 0 | 6.1 | 219 | 777 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 5.5 | 2 | 75 | 75 | **75 | 0 | 350 | 248 | 2.6 | 2 | 0 | 6.1 | 219 | 1494 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 5.5 | 3 | 20 | 75 | **75 | 0 | 350 | 248 | 2.6 | 2 | 0 | 6.1 | 219 | 1494 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 5.5 | 3 | 20 | 75 | **75 | 1 | 285 | 248 | 2.6 | 3 | 0 | 6.1 | 219 | 346 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 5.5 | 2 | 75 | 75 | **75 | 1 | 285 | 248 | 2.6 | 2 | 0 | 6.1 | 219 | 712 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 6.3 | 1 | 120 | 75 | 17 | 1 | 285 | 248 | 2.9 | 2 | 0 | 7.0 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | 5.5 | 2 | 75 | 75 | **75 | 0 | 350 | 248 | 2.6 | 2 | 0 | 6.1 | 219 | 679 |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 6.3 | 1 | 120 | 75 | 17 | 1 | 285 | 248 | 2.9 | 2 | 0 | 7.0 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 5.5 | 2 | 75 | 75 | **75 | 3 | 70 | 248 | **13 | 3 | 0 | 6.1 | 219 | 491 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 11097 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 100kg/ha

Table 14. DCWW Preseli

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|-----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Req kg/ha | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 6.3 | 3 | 20 | 75 | **45 | 1 | 285 | 248 | 0.6 | 2 | 0 | 1.2 | 250 | 2555 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 6.3 | 3 | 20 | 75 | **45 | 2- | 230 | 248 | **3.0 | 2 | 0 | 1.2 | 250 | 890 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 6.3 | 2 | 75 | 75 | **45 | 0 | 350 | 248 | 0.6 | 5 | 0 | 1.2 | 250 | 1033 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 6.3 | 3 | 20 | 75 | **45 | 3 | 70 | 248 | **3.0 | 3 | 0 | 1.2 | 250 | 888 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 6.3 | 2 | 75 | 75 | **45 | 0 | 350 | 248 | 0.6 | 2 | 0 | 1.2 | 250 | 1705 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 6.3 | 3 | 20 | 75 | **45 | 0 | 350 | 248 | 0.6 | 2 | 0 | 1.2 | 250 | 1705 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 6.3 | 3 | 20 | 75 | **45 | 1 | 285 | 248 | 0.6 | 3 | 0 | 1.2 | 250 | 395 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 6.3 | 2 | 75 | 75 | **45 | 1 | 285 | 248 | 0.6 | 2 | 0 | 1.2 | 250 | 813 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 6.3 | 1 | 120 | 75 | 9.1 | 1 | 285 | 248 | 0.6 | 2 | 0 | 1.2 | 250 | 575 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | | 2 | 75 | 75 | | 0 | 350 | 248 | | 2 | 0 | | | |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 6.3 | 1 | 120 | 75 | 9.1 | 1 | 285 | 248 | 0.6 | 2 | 0 | 1.2 | 250 | 608 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 6.3 | 2 | 75 | 75 | **45 | 3 | 70 | 248 | **3.0 | 3 | 0 | 1.2 | 250 | 560 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 11725 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 250t/ha is 50kg/ha

Table 15. DCWW Strata Florida

Nutrient Requirements for Land at Tyncwm

| | | | | | | N | | | P ₂ O ₅ | | | | K ₂ O | | | | Mg | | | | |
|-----------------|------------|-----------|---------------|-----------|---------|-----|---------|-----------|-------------------------------|----------|-----------|---------------|------------------|----------|-----------|---------------|--------|----------|---------------|-----------|---------------|
| Field Reference | Total Area | Sprd Area | Previous Crop | Next Crop | Soil pH | SNS | *In Req | Wst kg/ha | P Ind | Crop Req | Use kg/ha | *In Wst kg/ha | K Ind | Crop Req | Use kg/ha | *In Wst kg/ha | Mg Ind | Crop Req | *In Wst kg/ha | Rate t/ha | Totals tonnes |
| | | | | | | | | | | | | | | | | | | | | | |
| 1 | 10.90 | 10.22 | Grass | Grass | 7.0 | Mod | 235 | 3.2 | 3 | 20 | 75 | **75 | 1 | 285 | 248 | 0.3 | 2 | 0 | 0.9 | 162 | 1656 |
| 2 | 3.81 | 3.56 | Grass | Grass | 6.8 | Mod | 235 | 3.2 | 3 | 20 | 75 | **75 | 2- | 230 | 248 | **1.7 | 2 | 0 | 0.9 | 162 | 577 |
| 3 | 4.13 | 4.13 | Grass | Grass | 6.8 | Mod | 235 | 3.2 | 2 | 75 | 75 | **75 | 0 | 350 | 248 | 0.3 | 5 | 0 | 0.9 | 162 | 669 |
| 4 | 3.55 | 3.55 | Grass | Grass | 7.0 | Mod | 235 | 3.2 | 3 | 20 | 75 | **75 | 3 | 70 | 248 | **1.7 | 3 | 0 | 0.9 | 162 | 575 |
| 5A | 6.82 | 6.82 | Grass | Grass | 6.9 | Mod | 235 | 3.2 | 2 | 75 | 75 | **75 | 0 | 350 | 248 | 0.3 | 2 | 0 | 0.9 | 162 | 1105 |
| 5B | 6.82 | 6.82 | Grass | Grass | 6.7 | Mod | 235 | 3.2 | 3 | 20 | 75 | **75 | 0 | 350 | 248 | 0.3 | 2 | 0 | 0.9 | 162 | 1105 |
| 6 | 1.58 | 1.58 | Grass | Grass | 6.9 | Mod | 235 | 3.2 | 3 | 20 | 75 | **75 | 1 | 285 | 248 | 0.3 | 3 | 0 | 0.9 | 162 | 256 |
| 7 | 3.48 | 3.25 | Grass | Grass | 6.6 | Mod | 235 | 3.2 | 2 | 75 | 75 | **75 | 1 | 285 | 248 | 0.3 | 2 | 0 | 0.9 | 162 | 527 |
| 9 | 2.37 | 2.30 | Grass | Grass | 6.7 | Mod | 235 | 4.8 | 1 | 120 | 75 | 23 | 1 | 285 | 248 | 0.5 | 2 | 0 | 1.4 | 245 | 564 |
| 10 | 3.10 | 3.10 | Grass | Grass | 5.5 | Mod | 235 | | 2 | 75 | 75 | | 0 | 350 | 248 | | 2 | 0 | | | |
| 11 | 2.43 | 2.43 | Grass | Grass | 6.0 | Mod | 235 | 4.8 | 1 | 120 | 75 | 23 | 1 | 285 | 248 | 0.5 | 2 | 0 | 1.4 | 245 | 595 |
| 12 | 2.24 | 2.24 | Grass | Grass | 6.0 | Mod | 235 | 3.2 | 2 | 75 | 75 | **75 | 3 | 70 | 248 | **1.7 | 3 | 0 | 0.9 | 162 | 363 |
| Ha | 51.23 | 50.00 | | | | | | | | | | | | | | | | | | | 7990 |

Grass = 2 cut silage with aftermath grazing

Nutrient requirement based on values for grass with 2 cuts of silage with aftermath grazing (target DM yield 9-12t/ha) described in RB209 (2020)

Expected Grazing yield of 7-9t/ha

Grass crop use based on yield totalling 38t/ha where 1.7kg/t P₂O₅ and 6.0kg/t K₂O removed in offtake (RB209, 2020)

To account for aftermath grass grazing, 1/2 of the P & K requirement for grazing has been added, and 10kg/ha P and 20kg/ha K is added to crop use

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

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

Total N supplied at an application rate of 245t/ha is 135kg/ha

5 Compliance with NVZ regulations

Table 16. Compliance with NVZ regulations

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

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

6.1 Receiving soils

The nutrient status of individual fields to be registered are provided to table 6-15 above. General soil type(s) for the fields to be registered are;

Table 17. Soil type

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

The soil analyses (**Soil Analysis**) shows the soils to have ample background concentrations of Mg (*i.e.* ADAS Index of 2-5). It is therefore unlikely that the crop will require any additional input of Mg over the course of the cropping cycle. None of the wastes contain any notable concentration of Mg and therefore applications of these materials will not increase background levels in the receiving soil over time.

6.2 Waste characterisation

Full characterisations of individual wastes with total and available nutrients at the recommended rates for each waste stream are supplied in **Waste Analysis**. This information is further summarised against the nutrient requirements for proposed crops in Tables 6-15.

Limiting factors for the different wastes are as follows;

- Bontgoch and Llechryd liquids: Max rate of 250t/ha or total P on fields with P index ≥ 2
- Strata Florida liquid: Arsenic or total P on fields with P index ≥ 2
- All other liquids: Max rate of 250t/ha

6.3 Summary of benefits

These wastes are a source of essential elements N, P, K, macronutrients Mg, Ca, S and provide trace amounts of micronutrients. Wastes are beneficially used to replace a proportion of the bagged mineral

fertiliser used by farmers. The recommended application rates shown in Tables 6-15 are based on the crop requirement and soil analysis.

Clean water treatment sludges contain significant amounts of organic matter, for example, the dry solids in Strata Florida waste consist of 61% organic matter. Additions of organic matter to soil will improve soil structural stability, biological activity, water and nutrient holding capacity, i.e. resistance to drought, and reduction of localised flooding, reduced leaching of nutrients, and improved workability in soil. Organic matter is a particularly good source of N and S, and organic acids that aid nutrient solubility and uptake, as well as enhancing microbial activity for enhanced nutrient cycling in soils.

6.4 *Additional requirements*

Fields may require additional N, P, and K to achieve optimum yield.

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

7.1 *Potentially Toxic Elements (PTEs)*

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

7.2 *Other waste characteristics*

The pH levels in the wastes range from 5.5 – 6.7.

It is unlikely that soil pH will decrease following the application detailed here due to the extensive buffering capacity of the receiving soils. The pH levels of the receiving soils are between 5.5 and 7.0, therefore it is unlikely that availability of any naturally occurring heavy metals present in these soils will become more available after application of these wastes.

7.3 *Operational factors*

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

8 Sensitive human and environmental receptors

There are no identified risks to local potentially sensitive receptors. This is because the risk of emissions produced from the waste activity is low due to waste type and distance to the receptors from the activity.

Locations of sensitive receptors are shown in **T Map**. Prevailing winds are south-westerly.

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

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

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

10 Contingency planning

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

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

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

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

Sample Analysis Report

| | | | |
|----------------------------|-----------|---------------------|------------------------------------|
| Sampling Point No - | 120038 | Location - | BOLTON HILL Sludge Tankering Point |
| Date Sampled - | 09-Jan-20 | Time Taken - | 15:26 |
| Originator - | SEWAGE | Purpose - | EQO/DIRECTIVE COMPLIANCE |
| Laboratory - | GLASLYN | Lab Ref No - | S 6591303 |
| Sampler - | EXTA | No Results - | 20 |
| Type - | | | |

Sample Results

| Code | Determinand Name | Units | Result | Limit |
|------|---------------------|----------|---------|-------|
| 238 | Magnesium | MG/KG | 1990 | |
| 288 | ALUMINIUM (DRY WT) | MG/KG | 139000 | |
| 357 | ARSENIC (DRY WT) | MG/KG | 14.9 | |
| 4620 | pH | PH UNITS | 6.5 | |
| 7774 | WTW MERCURY TOTAL | MG/KG | LT 0.77 | |
| 8241 | LOSS ON IGNITION | % | 36.8 | |
| 9233 | Ammoniacal nitrogen | MG/KG | LT 238 | |
| 9234 | Sulphur | MG/KG | 5620 | |
| 9271 | Cadmium | MG/KG | 0.86 | |
| 9272 | CHROMIUM TOTAL | MG/KG | 27.5 | |
| 9273 | Copper | MG/KG | 45.5 | |
| 9275 | Nickel | MG/KG | 24 | |
| 9276 | LEAD TOTAL | MG/KG | LT 4.99 | |
| 9277 | ZINC TOTAL | MG/KG | 127 | |
| 9278 | IRON TOTAL | MG/KG | 24800 | |
| 9281 | % Dry solids | % | 2.58 | |
| 9282 | % Minerals | % | 63.2 | |
| 9283 | % K (dry weight) | % | 0.125 | |
| 9284 | % P (dry weight) | % | 0.315 | |
| 9285 | % N (dry weight) | % | 1.1 | |

DCWW Potable Water Treatment Sludge

Analysis of Bolton Hill liquid sludge

Date: 09/01/20

Lab ref no. S 6591303

| | |
|---------------------------|------|
| Application rate (t/ha) | 250 |
| Application rate (t/acre) | 100 |
| pH | 6.5 |
| Dry solids (%) | 2.6 |
| Organic matter (%) | 36.8 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|----------------------------|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 1.10 | % | 0.28 | 71.0 | 0.01 | 1.5 |
| Ammonium-N | 238 | mg/kg | 0.01 | 1.5 | | |
| Phosphorus (P) | 3150 | mg/kg | 0.08 | 20.3 | | |
| Phosphate (P2O5) | | | 0.19 | 46.3 | 0.0 | 9.3 |
| Potassium (K) | 1250 | mg/kg | 0.03 | 8.1 | | |
| Potash (K2O) | | | 0.04 | 9.7 | 0.0 | 1.9 |
| Magnesium (Mg) | 1990 | mg/kg | 0.05 | 12.8 | | |
| Magnesium (MgO) | | | 0.08 | 20.5 | 0.0 | 4.1 |
| Sulphur (S) | 5620 | mg/kg | 0.14 | 36.2 | | |
| Sulphur (SO ₃) | | | 0.36 | 90.6 | 0.0 | 9.1 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 127.0 | mg/kg | 3.3 | 0.82 | 15.00 |
| Copper | 45.5 | mg/kg | 1.17 | 0.29 | 7.50 |
| Nickel | 24.0 | mg/kg | 0.62 | 0.15 | 3.00 |
| Lead | 5.0 | mg/kg | 0.13 | 0.03 | 15.00 |
| Cadmium | 0.86 | mg/kg | 0.02 | 0.01 | 0.15 |
| Chromium | 27.5 | mg/kg | 0.71 | 0.18 | 15.00 |
| Mercury | 0.8 | mg/kg | 0.02 | 0.00 | 0.10 |
| Arsenic | 14.9 | mg/kg | 0.38 | 0.10 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 139000 | mg/kg | 3586.2 | 896.6 | |
| Iron | 24800 | mg/kg | 639.8 | 160.0 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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Sample Analysis Report

| | | | |
|----------------------------|-----------|---------------------|---------------------------------|
| Sampling Point No - | 100521 | Location - | BONTGOCH WTW SLUDGE TANKERING P |
| Date Sampled - | 04-Feb-20 | Time Taken - | 20:05 |
| Originator - | SEWAGE | Purpose - | EQO/DIRECTIVE COMPLIANCE |
| Laboratory - | GLASLYN | Lab Ref No - | S 6614677 |
| Sampler - | EXTA | No Results - | 20 |
| Type - | | | |

Sample Results

| Code | Determinand Name | Units | Result | Limit |
|------|---------------------|----------|---------|-------|
| 238 | Magnesium | MG/KG | 248 | |
| 288 | ALUMINIUM (DRY WT) | MG/KG | 129000 | |
| 357 | ARSENIC (DRY WT) | MG/KG | 39.1 | |
| 4620 | pH | PH UNITS | 6.3 | |
| 7774 | WTW MERCURY TOTAL | MG/KG | LT 0.31 | |
| 8241 | LOSS ON IGNITION | % | 60.2 | |
| 9233 | Ammoniacal nitrogen | MG/KG | LT 296 | |
| 9234 | Sulphur | MG/KG | 4710 | |
| 9271 | Cadmium | MG/KG | 0.41 | |
| 9272 | CHROMIUM TOTAL | MG/KG | 6.94 | |
| 9273 | Copper | MG/KG | 20.3 | |
| 9275 | Nickel | MG/KG | 8.7 | |
| 9276 | LEAD TOTAL | MG/KG | 53.9 | |
| 9277 | ZINC TOTAL | MG/KG | 93.6 | |
| 9278 | IRON TOTAL | MG/KG | 22500 | |
| 9281 | % Dry solids | % | 6.62 | |
| 9282 | % Minerals | % | 39.8 | |
| 9283 | % K (dry weight) | % | 0.0113 | |
| 9284 | % P (dry weight) | % | 0.259 | |
| 9285 | % N (dry weight) | % | 0.869 | |

DCWW Potable Water Treatment Sludge

Analysis of Bontgoch liquid sludge

Date: 04/02/20

Lab ref no. S 6614677

| | |
|---------------------------|------|
| Application rate (t/ha) | 191 |
| Application rate (t/acre) | 76 |
| pH | 6.3 |
| Dry solids (%) | 6.6 |
| Organic matter (%) | 60.2 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|----------------------------|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.87 | % | 0.58 | 109.9 | 0.02 | 3.7 |
| Ammonium-N | 296 | mg/kg | 0.02 | 3.7 | | |
| Phosphorus (P) | 2590 | mg/kg | 0.17 | 32.7 | | |
| Phosphate (P2O5) | | | 0.39 | 74.7 | 0.1 | 14.9 |
| Potassium (K) | 113 | mg/kg | 0.01 | 1.4 | | |
| Potash (K2O) | | | 0.01 | 1.7 | 0.0 | 0.3 |
| Magnesium (Mg) | 248 | mg/kg | 0.02 | 3.1 | | |
| Magnesium (MgO) | | | 0.03 | 5.0 | 0.0 | 1.0 |
| Sulphur (S) | 4710 | mg/kg | 0.31 | 59.6 | | |
| Sulphur (SO ₃) | | | 0.78 | 148.9 | 0.1 | 14.9 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 93.6 | mg/kg | 6.2 | 1.18 | 15.00 |
| Copper | 20.3 | mg/kg | 1.34 | 0.26 | 7.50 |
| Nickel | 8.7 | mg/kg | 0.58 | 0.11 | 3.00 |
| Lead | 53.9 | mg/kg | 3.57 | 0.68 | 15.00 |
| Cadmium | 0.41 | mg/kg | 0.03 | 0.01 | 0.15 |
| Chromium | 6.9 | mg/kg | 0.46 | 0.09 | 15.00 |
| Mercury | 0.3 | mg/kg | 0.02 | 0.00 | 0.10 |
| Arsenic | 39.1 | mg/kg | 2.59 | 0.49 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 129000 | mg/kg | 8539.8 | 1631.1 | |
| Iron | 22500 | mg/kg | 1489.5 | 284.5 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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DCWW Potable Water Treatment Sludge

Analysis of Bontgoch liquid sludge

Date: 04/02/20

Lab ref no. S 6614677

| | |
|---------------------------|------|
| Application rate (t/ha) | 250 |
| Application rate (t/acre) | 100 |
| pH | 6.3 |
| Dry solids (%) | 6.6 |
| Organic matter (%) | 60.2 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|----------------------------|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.87 | % | 0.58 | 143.8 | 0.02 | 4.9 |
| Ammonium-N | 296 | mg/kg | 0.02 | 4.9 | | |
| Phosphorus (P) | 2590 | mg/kg | 0.17 | 42.9 | | |
| Phosphate (P2O5) | | | 0.39 | 97.7 | 0.1 | 19.5 |
| Potassium (K) | 113 | mg/kg | 0.01 | 1.9 | | |
| Potash (K2O) | | | 0.01 | 2.2 | 0.0 | 0.4 |
| Magnesium (Mg) | 248 | mg/kg | 0.02 | 4.1 | | |
| Magnesium (MgO) | | | 0.03 | 6.6 | 0.0 | 1.3 |
| Sulphur (S) | 4710 | mg/kg | 0.31 | 78.0 | | |
| Sulphur (SO ₃) | | | 0.78 | 194.9 | 0.1 | 19.5 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 93.6 | mg/kg | 6.2 | 1.55 | 15.00 |
| Copper | 20.3 | mg/kg | 1.34 | 0.34 | 7.50 |
| Nickel | 8.7 | mg/kg | 0.58 | 0.14 | 3.00 |
| Lead | 53.9 | mg/kg | 3.57 | 0.89 | 15.00 |
| Cadmium | 0.41 | mg/kg | 0.03 | 0.01 | 0.15 |
| Chromium | 6.9 | mg/kg | 0.46 | 0.11 | 15.00 |
| Mercury | 0.3 | mg/kg | 0.02 | 0.01 | 0.10 |
| Arsenic | 39.1 | mg/kg | 2.59 | 0.65 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 129000 | mg/kg | 8539.8 | 2135.0 | |
| Iron | 22500 | mg/kg | 1489.5 | 372.4 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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Sample Analysis Report

| | | | |
|----------------------------|-----------|---------------------|-------------------------------|
| Sampling Point No - | 79131 | Location - | BRYNGWYN WTW SLUDGE TANKERING |
| Date Sampled - | 09-Jan-20 | Time Taken - | 15:30 |
| Originator - | SEWAGE | Purpose - | EQO/DIRECTIVE COMPLIANCE |
| Laboratory - | GLASLYN | Lab Ref No - | S 6591307 |
| Sampler - | EXTA | No Results - | 20 |
| Type - | | | |

Sample Results

| Code | Determinand Name | Units | Result | Limit |
|------|---------------------|----------|---------|-------|
| 238 | Magnesium | MG/KG | 551 | |
| 288 | ALUMINIUM (DRY WT) | MG/KG | 1980 | |
| 357 | ARSENIC (DRY WT) | MG/KG | LT 24.7 | |
| 4620 | pH | PH UNITS | 6 | |
| 7774 | WTW MERCURY TOTAL | MG/KG | LT 0.83 | |
| 8241 | LOSS ON IGNITION | % | 33.7 | |
| 9233 | Ammoniacal nitrogen | MG/KG | LT 250 | |
| 9234 | Sulphur | MG/KG | 2920 | |
| 9271 | Cadmium | MG/KG | LT 0.38 | |
| 9272 | CHROMIUM TOTAL | MG/KG | 10.4 | |
| 9273 | Copper | MG/KG | LT 4.77 | |
| 9275 | Nickel | MG/KG | LT 3.54 | |
| 9276 | LEAD TOTAL | MG/KG | LT 5.34 | |
| 9277 | ZINC TOTAL | MG/KG | 121 | |
| 9278 | IRON TOTAL | MG/KG | 401000 | |
| 9281 | % Dry solids | % | 2.43 | |
| 9282 | % Minerals | % | 66.3 | |
| 9283 | % K (dry weight) | % | 0.0136 | |
| 9284 | % P (dry weight) | % | 0.0697 | |
| 9285 | % N (dry weight) | % | 0.55 | |

DCWW Potable Water Treatment Sludge

Analysis of Bryngwyn liquid sludge

Date: 09/01/20

Lab ref no. S 6591307

| | |
|---------------------------|------|
| Application rate (t/ha) | 250 |
| Application rate (t/acre) | 100 |
| pH | 6.0 |
| Dry solids (%) | 2.4 |
| Organic matter (%) | 33.7 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|--|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.55 | % | 0.13 | 33.4 | 0.01 | 1.5 |
| Ammonium-N | 250 | mg/kg | 0.01 | 1.5 | | |
| Phosphorus (P) | 697 | mg/kg | 0.02 | 4.2 | | |
| Phosphate (P ₂ O ₅) | | | 0.04 | 9.7 | 0.0 | 1.9 |
| Potassium (K) | 136 | mg/kg | 0.00 | 0.8 | | |
| Potash (K ₂ O) | | | 0.00 | 1.0 | 0.0 | 0.2 |
| Magnesium (Mg) | 551 | mg/kg | 0.01 | 3.3 | | |
| Magnesium (MgO) | | | 0.02 | 5.4 | 0.0 | 1.1 |
| Sulphur (S) | 2920 | mg/kg | 0.07 | 17.7 | | |
| Sulphur (SO ₃) | | | 0.18 | 44.3 | 0.0 | 4.4 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 121.0 | mg/kg | 2.9 | 0.74 | 15.00 |
| Copper | 4.8 | mg/kg | 0.12 | 0.03 | 7.50 |
| Nickel | 3.5 | mg/kg | 0.09 | 0.02 | 3.00 |
| Lead | 5.3 | mg/kg | 0.13 | 0.03 | 15.00 |
| Cadmium | 0.38 | mg/kg | 0.01 | 0.00 | 0.15 |
| Chromium | 10.4 | mg/kg | 0.25 | 0.06 | 15.00 |
| Mercury | 0.8 | mg/kg | 0.02 | 0.01 | 0.10 |
| Arsenic | 24.7 | mg/kg | 0.60 | 0.15 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 1980 | mg/kg | 48.1 | 12.0 | |
| Iron | 401000 | mg/kg | 9744.3 | 2436.1 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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Sample Analysis Report

| | | | |
|----------------------------|-----------|---------------------|---------------------------------------|
| Sampling Point No - | 122055 | Location - | Capel Dewi WTW Sludge Tankering Point |
| Date Sampled - | 09-Jan-20 | Time Taken - | 15:28 |
| Originator - | SEWAGE | Purpose - | EQO/DIRECTIVE COMPLIANCE |
| Laboratory - | GLASLYN | Lab Ref No - | S 6591305 |
| Sampler - | EXTA | No Results - | 20 |
| Type - | | | |

Sample Results

| Code | Determinand Name | Units | Result | Limit |
|------|---------------------|----------|---------|-------|
| 238 | Magnesium | MG/KG | 1060 | |
| 288 | ALUMINIUM (DRY WT) | MG/KG | 45300 | |
| 357 | ARSENIC (DRY WT) | MG/KG | 30 | |
| 4620 | pH | PH UNITS | 6.2 | |
| 7774 | WTW MERCURY TOTAL | MG/KG | LT 0.82 | |
| 8241 | LOSS ON IGNITION | % | 35.3 | |
| 9233 | Ammoniacal nitrogen | MG/KG | LT 251 | |
| 9234 | Sulphur | MG/KG | 4430 | |
| 9271 | Cadmium | MG/KG | LT 0.38 | |
| 9272 | CHROMIUM TOTAL | MG/KG | 14.4 | |
| 9273 | Copper | MG/KG | 14.4 | |
| 9275 | Nickel | MG/KG | 10.2 | |
| 9276 | LEAD TOTAL | MG/KG | 10 | |
| 9277 | ZINC TOTAL | MG/KG | 138 | |
| 9278 | IRON TOTAL | MG/KG | 324000 | |
| 9281 | % Dry solids | % | 2.43 | |
| 9282 | % Minerals | % | 64.7 | |
| 9283 | % K (dry weight) | % | 0.0579 | |
| 9284 | % P (dry weight) | % | 0.158 | |
| 9285 | % N (dry weight) | % | 0.88 | |

DCWW Potable Water Treatment Sludge

Analysis of Capel Dewi liquid sludge

Date: 09/01/20

Lab ref no. S 6591305

| | |
|---------------------------|------|
| Application rate (t/ha) | 250 |
| Application rate (t/acre) | 100 |
| pH | 6.2 |
| Dry solids (%) | 2.4 |
| Organic matter (%) | 35.3 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|--|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.88 | % | 0.21 | 53.5 | 0.01 | 1.5 |
| Ammonium-N | 251 | mg/kg | 0.01 | 1.5 | | |
| Phosphorus (P) | 1580 | mg/kg | 0.04 | 9.6 | | |
| Phosphate (P ₂ O ₅) | | | 0.09 | 21.9 | 0.0 | 4.4 |
| Potassium (K) | 579 | mg/kg | 0.01 | 3.5 | | |
| Potash (K ₂ O) | | | 0.02 | 4.2 | 0.0 | 0.8 |
| Magnesium (Mg) | 1060 | mg/kg | 0.03 | 6.4 | | |
| Magnesium (MgO) | | | 0.04 | 10.3 | 0.0 | 2.1 |
| Sulphur (S) | 4430 | mg/kg | 0.11 | 26.9 | | |
| Sulphur (SO ₃) | | | 0.27 | 67.3 | 0.0 | 6.7 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 138.0 | mg/kg | 3.4 | 0.84 | 15.00 |
| Copper | 14.4 | mg/kg | 0.35 | 0.09 | 7.50 |
| Nickel | 10.2 | mg/kg | 0.25 | 0.06 | 3.00 |
| Lead | 10.0 | mg/kg | 0.24 | 0.06 | 15.00 |
| Cadmium | 0.38 | mg/kg | 0.01 | 0.00 | 0.15 |
| Chromium | 14.4 | mg/kg | 0.35 | 0.09 | 15.00 |
| Mercury | 0.8 | mg/kg | 0.02 | 0.00 | 0.10 |
| Arsenic | 30.0 | mg/kg | 0.73 | 0.18 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 45300 | mg/kg | 1100.8 | 275.2 | |
| Iron | 324000 | mg/kg | 7873.2 | 1968.3 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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ADAM STONE
4R GROUP
12C NEWENT BUS PARK
GLOUCESTER STREET
NEWENT
GLOUCESTERSHIRE GL18 1DZ

V293

Please quote above code for all enquiries

CEFN DRYSCOED WTW
YSTRADFELLTE
NEATH
SA11 5UP

LIQUID WASTE

LIQUID WASTE

Sample Reference :

CEFN DRYSCOED LIQUID

Sample Matrix : LIQUID WASTE

Laboratory References

| | |
|---------------|-------|
| Report Number | 86793 |
| Sample Number | 92206 |

| | |
|---------------|-------------|
| Date Received | 10-FEB-2020 |
| Date Reported | 13-FEB-2020 |

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 | 3.88 | % |
| Conductivity 1:6 | 35.0 | uS/cm |
| Total Kjeldahl Nitrogen | 0.02 | % w/w |
| Ammonium Nitrogen | <25 | mg/kg |
| Total Phosphorus (P) | 20.0 | mg/kg |
| Total Potassium (K) | 16.6 | mg/kg |
| Total Magnesium (Mg) | 12.9 | mg/kg |
| Total Copper (Cu) | 1.25 | mg/kg |
| Total Zinc (Zn) | 4.06 | mg/kg |
| Total Sulphur (S) | 481 | mg/kg |

Released by Myles Nicholson

Date 13/02/20



ADAM STONE
4R GROUP
12C NEWENT BUS PARK
GLOUCESTER STREET
NEWENT
GLOUCESTERSHIRE GL18 1DZ

V293

Please quote above code for all enquiries

CEFN DRYSCOED WTW
YSTRADFELLTE
NEATH
SA11 5UP

LIQUID WASTE

LIQUID WASTE

Sample Reference :

CEFN DRYSCOED LIQUID

Sample Matrix : LIQUID WASTE

Laboratory References

| | |
|---------------|-------|
| Report Number | 86793 |
| Sample Number | 92206 |

| | |
|---------------|-------------|
| Date Received | 10-FEB-2020 |
| Date Reported | 13-FEB-2020 |

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) | 35.4 | mg/kg |
| Total Iron (Fe) | 278 | mg/kg |
| Total Molybdenum (Mo) | <0.05 | mg/kg |
| Total Lead (Pb) | 5.48 | mg/kg |
| Total Cadmium (Cd) | 0.02 | mg/kg |
| Total Mercury (Hg) | <0.05 | mg/kg |
| Total Nickel (Ni) | 0.46 | mg/kg |
| Total Chromium (Cr) | 0.43 | mg/kg |
| Total Sodium (Na) | <10 | mg/kg |
| pH 1:6 [Fresh] | 5.56 | |

Released by Myles Nicholson

Date 13/02/20



ADAM STONE
4R GROUP
12C NEWENT BUS PARK
GLOUCESTER STREET
NEWENT
GLOUCESTERSHIRE GL18 1DZ

V293

Please quote above code for all enquiries

CEFN DRYSCOED WTW
YSTRADFELLTE
NEATH
SA11 5UP

LIQUID WASTE

LIQUID WASTE

Sample Reference :

CEFN DRYSCOED LIQUID

Sample Matrix : LIQUID WASTE

Laboratory References

| | |
|---------------|-------|
| Report Number | 86793 |
| Sample Number | 92206 |

| | |
|---------------|-------------|
| Date Received | 10-FEB-2020 |
| Date Reported | 13-FEB-2020 |

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 |
|---|-------|-------|
| Organic Matter LOI | 1.99 | % w/w |
| Lime Equivalent as CaCO ₃ | <2 | % w/w |
| Total Aluminium | 6502 | mg/kg |
| Fluoride [100:1 H ₂ SO ₄ Soluble] | 20.0 | mg/kg |
| Total Arsenic (As) | 1.99 | mg/kg |
| Total Selenium (Se) | 0.04 | mg/kg |
| Neutralising Value as CaO [TNV] | <1 | % w/w |

Released by *Myles Nicholson*

Date *13/02/20*

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS
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DCWW Potable Water Treatment Sludge

Analysis of Cefn Dryscoed liquid sludge

Date: 13/02/20

Lab report no. 86793

Lab sample no. 92206

Application rate (t/ha) 250
Application rate (t/acre) 100
pH 5.56
Dry solids (%) 3.88
Organic matter LOI (%) 1.99

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|--|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.02 | % | 0.20 | 50.0 | 0.03 | 6.3 |
| Ammonium-N | 25 | mg/kg | 0.03 | 6.3 | | |
| Phosphorus (P) | 20 | mg/kg | 0.02 | | | |
| Phosphate (P ₂ O ₅) | | | 0.05 | 11.4 | 0.01 | 2.3 |
| Potassium (K) | 16.6 | mg/kg | 0.02 | | | |
| Potash (K ₂ O) | | | 0.02 | 5.0 | 0.00 | 1.0 |
| Magnesium (Mg) | 12.9 | mg/kg | 0.01 | | | |
| Magnesium (MgO) | | | 0.02 | 5.2 | 0.00 | 1.0 |
| Sulphur (S) | 481 | mg/kg | 0.48 | | | |
| Sulphur (SO ₃) | | | 1.20 | 300.6 | 0.24 | 60.1 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Rate | | Limit |
|----------------|--------|-------|-----------|----------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 4.06 | mg/kg | 4.06 | 1.02 | 15.00 |
| Copper | 1.25 | mg/kg | 1.25 | 0.31 | 7.50 |
| Nickel | 0.46 | mg/kg | 0.46 | 0.12 | 3.00 |
| Lead | 5.5 | mg/kg | 5.48 | 1.37 | 15.00 |
| Cadmium | 0.02 | mg/kg | 0.02 | 0.01 | 0.15 |
| Chromium | 0.43 | mg/kg | 0.43 | 0.11 | 15.00 |
| Mercury | 0.05 | mg/kg | 0.05 | 0.01 | 0.10 |
| Arsenic | 1.99 | mg/kg | 1.99 | 0.50 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 6502 | mg/kg | 6502.0 | 1625.5 | |
| Iron | 278 | mg/kg | 278.0 | 69.5 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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Sample Analysis Report

| | | | |
|----------------------------|-----------|---------------------|---------------------------------|
| Sampling Point No - | 79114 | Location - | CRAY WTW SLUDGE TANKERING POINT |
| Date Sampled - | 20-Jan-20 | Time Taken - | 14:30 |
| Originator - | SEWAGE | Purpose - | EQO/DIRECTIVE COMPLIANCE |
| Laboratory - | GLASLYN | Lab Ref No - | S 6599611 |
| Sampler - | EXTA | No Results - | 20 |
| Type - | | | |

Sample Results

| Code | Determinand Name | Units | Result | Limit |
|------|---------------------|----------|---------|-------|
| 238 | Magnesium | MG/KG | 647 | |
| 288 | ALUMINIUM (DRY WT) | MG/KG | 3330 | |
| 357 | ARSENIC (DRY WT) | MG/KG | 33.6 | |
| 4620 | pH | PH UNITS | 5.3 | |
| 7774 | WTW MERCURY TOTAL | MG/KG | LT 0.77 | |
| 8241 | LOSS ON IGNITION | % | 36.4 | |
| 9233 | Ammoniacal nitrogen | MG/KG | LT 234 | |
| 9234 | Sulphur | MG/KG | 9080 | |
| 9271 | Cadmium | MG/KG | LT 0.36 | |
| 9272 | CHROMIUM TOTAL | MG/KG | 11.5 | |
| 9273 | Copper | MG/KG | 13.3 | |
| 9275 | Nickel | MG/KG | LT 5.1 | |
| 9276 | LEAD TOTAL | MG/KG | 24.2 | |
| 9277 | ZINC TOTAL | MG/KG | 137 | |
| 9278 | IRON TOTAL | MG/KG | 416000 | |
| 9281 | % Dry solids | % | 2.62 | |
| 9282 | % Minerals | % | 63.6 | |
| 9283 | % K (dry weight) | % | 0.0436 | |
| 9284 | % P (dry weight) | % | 0.0788 | |
| 9285 | % N (dry weight) | % | 0.909 | |

DCWW Potable Water Treatment Sludge

Analysis of Crai liquid sludge

Date: 20/01/20

Lab ref no. S 6599611

| | |
|---------------------------|------|
| Application rate (t/ha) | 250 |
| Application rate (t/acre) | 100 |
| pH | 5.3 |
| Dry solids (%) | 2.6 |
| Organic matter (%) | 36.4 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|----------------------------|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.91 | % | 0.24 | 59.5 | 0.01 | 1.5 |
| Ammonium-N | 234 | mg/kg | 0.01 | 1.5 | | |
| Phosphorus (P) | 788 | mg/kg | 0.02 | 5.2 | | |
| Phosphate (P2O5) | | | 0.05 | 11.8 | 0.0 | 2.4 |
| Potassium (K) | 436 | mg/kg | 0.01 | 2.9 | | |
| Potash (K2O) | | | 0.01 | 3.4 | 0.0 | 0.7 |
| Magnesium (Mg) | 647 | mg/kg | 0.02 | 4.2 | | |
| Magnesium (MgO) | | | 0.03 | 6.8 | 0.0 | 1.4 |
| Sulphur (S) | 9080 | mg/kg | 0.24 | 59.5 | | |
| Sulphur (SO ₃) | | | 0.59 | 148.7 | 0.1 | 14.9 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 137.0 | mg/kg | 3.6 | 0.90 | 15.00 |
| Copper | 13.3 | mg/kg | 0.35 | 0.09 | 7.50 |
| Nickel | 5.1 | mg/kg | 0.13 | 0.03 | 3.00 |
| Lead | 24.2 | mg/kg | 0.63 | 0.16 | 15.00 |
| Cadmium | 0.36 | mg/kg | 0.01 | 0.00 | 0.15 |
| Chromium | 11.5 | mg/kg | 0.30 | 0.08 | 15.00 |
| Mercury | 0.8 | mg/kg | 0.02 | 0.01 | 0.10 |
| Arsenic | 33.6 | mg/kg | 0.88 | 0.22 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 3330 | mg/kg | 87.2 | 21.8 | |
| Iron | 416000 | mg/kg | 10899.2 | 2724.8 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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Sample Analysis Report

| | | | |
|----------------------------|-----------|---------------------|---------------------------------|
| Sampling Point No - | 303551 | Location - | HIRWAUN WTW SLUDGE TANKERING PO |
| Date Sampled - | 03-Sep-19 | Time Taken - | 12:18 |
| Originator - | SEWAGE | Purpose - | EQO/DIRECTIVE COMPLIANCE |
| Laboratory - | GLASLYN | Lab Ref No - | S 6468449 |
| Sampler - | EXTA | No Results - | 21 |
| Type - | | | |

Sample Results

| Code | Determinand Name | Units | Result | Limit |
|------|---------------------|----------|---------|-------|
| 238 | Magnesium | MG/KG | 296 | |
| 288 | ALUMINIUM (DRY WT) | MG/KG | 2610 | |
| 357 | ARSENIC (DRY WT) | MG/KG | 76.6 | |
| 403 | Manganese | MG/L | 1500 | |
| 4620 | pH | PH UNITS | 6.7 | |
| 7774 | WTW MERCURY TOTAL | MG/KG | LT 0.69 | |
| 8241 | LOSS ON IGNITION | % | 46.9 | |
| 9233 | Ammoniacal nitrogen | MG/KG | 763 | |
| 9234 | Sulphur | MG/KG | 7880 | |
| 9271 | Cadmium | MG/KG | 0.67 | |
| 9272 | CHROMIUM TOTAL | MG/KG | 2.63 | |
| 9273 | Copper | MG/KG | 31.5 | |
| 9275 | Nickel | MG/KG | 11.6 | |
| 9276 | LEAD TOTAL | MG/KG | 18.3 | |
| 9277 | ZINC TOTAL | MG/KG | 131 | |
| 9278 | IRON TOTAL | MG/KG | 371000 | |
| 9281 | % Dry solids | % | 2.88 | |
| 9282 | % Minerals | % | 53.1 | |
| 9283 | % K (dry weight) | % | 0.01 | |
| 9284 | % P (dry weight) | % | 0.04 | |
| 9285 | % N (dry weight) | % | 1.23 | |

DCWW Potable Water Treatment Sludge

Analysis of Hirwaun liquid sludge

Date: 03/09/19

Lab ref no. S 6468449

| | |
|---------------------------|------|
| Application rate (t/ha) | 250 |
| Application rate (t/acre) | 100 |
| pH | 6.7 |
| Dry solids (%) | 2.9 |
| Organic matter (%) | 46.9 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|----------------------------|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 1.23 | % | 0.35 | 88.6 | 0.02 | 5.5 |
| Ammonium-N | 763 | mg/kg | 0.02 | 5.5 | | |
| Phosphorus (P) | 400 | mg/kg | 0.01 | 2.9 | | |
| Phosphate (P2O5) | | | 0.03 | 6.6 | 0.0 | 1.3 |
| Potassium (K) | 100 | mg/kg | 0.00 | 0.7 | | |
| Potash (K2O) | | | 0.00 | 0.9 | 0.0 | 0.2 |
| Magnesium (Mg) | 296 | mg/kg | 0.01 | 2.1 | | |
| Magnesium (MgO) | | | 0.01 | 3.4 | 0.0 | 0.7 |
| Sulphur (S) | 7880 | mg/kg | 0.23 | 56.7 | | |
| Sulphur (SO ₃) | | | 0.57 | 141.8 | 0.1 | 14.2 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 131.0 | mg/kg | 3.8 | 0.94 | 15.00 |
| Copper | 31.5 | mg/kg | 0.91 | 0.23 | 7.50 |
| Nickel | 11.6 | mg/kg | 0.33 | 0.08 | 3.00 |
| Lead | 18.3 | mg/kg | 0.53 | 0.13 | 15.00 |
| Cadmium | 0.67 | mg/kg | 0.02 | 0.00 | 0.15 |
| Chromium | 2.6 | mg/kg | 0.08 | 0.02 | 15.00 |
| Mercury | 0.7 | mg/kg | 0.02 | 0.00 | 0.10 |
| Arsenic | 76.6 | mg/kg | 2.21 | 0.55 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 2610 | mg/kg | 75.2 | 18.8 | |
| Iron | 371000 | mg/kg | 10684.8 | 2671.2 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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LLECHRYD WTW
LLECHRYD
CARDIGAN

SLUDGE

SLUDGE

Sample Reference :

LLECHRYD LIQUID

Sample Matrix : SLUDGE

Laboratory References

| | |
|---------------|-------|
| Report Number | 85962 |
| Sample Number | 91867 |

| | |
|---------------|-------------|
| Date Received | 04-FEB-2020 |
| Date Reported | 11-FEB-2020 |

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 | 3.69 | % |
| Conductivity 1:6 | 53.6 | uS/cm |
| Total Kjeldahl Nitrogen | 0.04 | % w/w |
| Ammonium Nitrogen | <25 | mg/kg |
| Total Phosphorus (P) | 150 | mg/kg |
| Total Potassium (K) | 49.0 | mg/kg |
| Total Magnesium (Mg) | 87.7 | mg/kg |
| Total Copper (Cu) | 1.59 | mg/kg |
| Total Zinc (Zn) | 8.14 | mg/kg |
| Total Sulphur (S) | 79.4 | mg/kg |

Released by Myles Nicholson

Date 11/02/20



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LLECHRYD
CARDIGAN

SLUDGE

SLUDGE

Sample Reference :

LLECHRYD LIQUID

Sample Matrix : SLUDGE

Laboratory References

| | |
|---------------|-------|
| Report Number | 85962 |
| Sample Number | 91867 |

| | |
|---------------|-------------|
| Date Received | 04-FEB-2020 |
| Date Reported | 11-FEB-2020 |

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) | 235 | mg/kg |
| Total Iron (Fe) | 8906 | mg/kg |
| Total Lead (Pb) | 1.02 | mg/kg |
| Total Cadmium (Cd) | 0.02 | mg/kg |
| Total Mercury (Hg) | <0.05 | mg/kg |
| Total Nickel (Ni) | 1.00 | mg/kg |
| Total Chromium (Cr) | 1.32 | mg/kg |
| Total Sodium (Na) | 19.6 | mg/kg |
| pH 1:6 [Fresh] | 6.41 | |
| Total Aluminium | 364 | mg/kg |

Released by Myles Nicholson

Date 11/02/20



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LLECHRYD WTW
LLECHRYD
CARDIGAN

SLUDGE

SLUDGE

Sample Reference :

LLECHRYD LIQUID

Sample Matrix : SLUDGE

Laboratory References

| | |
|---------------|-------|
| Report Number | 85962 |
| Sample Number | 91867 |

| | |
|---------------|-------------|
| Date Received | 04-FEB-2020 |
| Date Reported | 11-FEB-2020 |

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 Arsenic (As) | 0.87 | mg/kg |

Released by *Myles Nicholson*

Date *11/02/20*

DCWW Potable Water Treatment Sludge

Analysis of Llechryd liquid sludge

Date: 11/02/20

Lab report no. 85962

Lab sample no. 91867

Application rate (t/ha) 219
 Application rate (t/acre) 88
 pH 6.41
 Dry solids (%) 3.69

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|--|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.04 | % | 0.40 | 87.6 | 0.03 | 5.5 |
| Ammonium-N | 25 | mg/kg | 0.03 | 5.5 | | |
| Phosphorus (P) | 150 | mg/kg | 0.15 | | | |
| Phosphate (P ₂ O ₅) | | | 0.34 | 74.9 | 0.07 | 15.0 |
| Potassium (K) | 49 | mg/kg | 0.05 | | | |
| Potash (K ₂ O) | | | 0.06 | 12.9 | 0.01 | 2.6 |
| Magnesium (Mg) | 87.7 | mg/kg | 0.09 | | | |
| Magnesium (MgO) | | | 0.14 | 30.7 | 0.03 | 6.1 |
| Sulphur (S) | 79.4 | mg/kg | 0.08 | | | |
| Sulphur (SO ₃) | | | 0.20 | 43.5 | 0.04 | 8.7 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Rate | | Limit |
|----------------|--------|-------|-----------|----------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 8.14 | mg/kg | 8.14 | 1.78 | 15.00 |
| Copper | 1.59 | mg/kg | 1.59 | 0.35 | 7.50 |
| Nickel | 1.00 | mg/kg | 1.00 | 0.22 | 3.00 |
| Lead | 1.0 | mg/kg | 1.02 | 0.22 | 15.00 |
| Cadmium | 0.02 | mg/kg | 0.02 | 0.00 | 0.15 |
| Chromium | 1.32 | mg/kg | 1.32 | 0.29 | 15.00 |
| Mercury | 0.05 | mg/kg | 0.05 | 0.01 | 0.10 |
| Arsenic | 0.87 | mg/kg | 0.87 | 0.19 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 364 | mg/kg | 364.0 | 79.7 | |
| Iron | 8906 | mg/kg | 8906.0 | 1950.4 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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DCWW Potable Water Treatment Sludge

Analysis of Llechryd liquid sludge

Date: 11/02/20

Lab report no. 85962

Lab sample no. 91867

Application rate (t/ha) 250
Application rate (t/acre) 100
pH 6.41
Dry solids (%) 3.69

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|--|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.04 | % | 0.40 | 100.0 | 0.03 | 6.3 |
| Ammonium-N | 25 | mg/kg | 0.03 | 6.3 | | |
| Phosphorus (P) | 150 | mg/kg | 0.15 | | | |
| Phosphate (P ₂ O ₅) | | | 0.34 | 85.5 | 0.07 | 17.1 |
| Potassium (K) | 49 | mg/kg | 0.05 | | | |
| Potash (K ₂ O) | | | 0.06 | 14.7 | 0.01 | 2.9 |
| Magnesium (Mg) | 87.7 | mg/kg | 0.09 | | | |
| Magnesium (MgO) | | | 0.14 | 35.1 | 0.03 | 7.0 |
| Sulphur (S) | 79.4 | mg/kg | 0.08 | | | |
| Sulphur (SO ₃) | | | 0.20 | 49.6 | 0.04 | 9.9 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Rate | | Limit |
|----------------|--------|-------|-----------|----------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 8.14 | mg/kg | 8.14 | 2.04 | 15.00 |
| Copper | 1.59 | mg/kg | 1.59 | 0.40 | 7.50 |
| Nickel | 1.00 | mg/kg | 1.00 | 0.25 | 3.00 |
| Lead | 1.0 | mg/kg | 1.02 | 0.26 | 15.00 |
| Cadmium | 0.02 | mg/kg | 0.02 | 0.01 | 0.15 |
| Chromium | 1.32 | mg/kg | 1.32 | 0.33 | 15.00 |
| Mercury | 0.05 | mg/kg | 0.05 | 0.01 | 0.10 |
| Arsenic | 0.87 | mg/kg | 0.87 | 0.22 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 364 | mg/kg | 364.0 | 91.0 | |
| Iron | 8906 | mg/kg | 8906.0 | 2226.5 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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PRESELI WTW
PRESELI
PEMBROKE

SLUDGE

SLURRY/SLUDGE ANALYSIS RESULTS

Sample Reference :

PRESELI LIQUID

Sample Matrix : SLURRY/SLUDGE

Laboratory References

| | |
|---------------|-------|
| Report Number | 83781 |
| Sample Number | 91084 |

| | |
|---------------|-------------|
| Date Received | 17-JAN-2020 |
| Date Reported | 23-JAN-2020 |

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 | 1.58 | % |
| Conductivity 1:6 | 49.0 | uS/cm |
| Total Kjeldahl Nitrogen | 0.02 | % w/w |
| Ammonium Nitrogen | <25 | mg/kg |
| Total Phosphorus (P) | 79.4 | mg/kg |
| Total Potassium (K) | <10 | mg/kg |
| Total Magnesium (Mg) | 15.5 | mg/kg |
| Total Copper (Cu) | 0.46 | mg/kg |
| Total Zinc (Zn) | 2.91 | mg/kg |
| Total Sulphur (S) | 170 | mg/kg |

Released by Myles Nicholson

Date 23/01/20



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SLUDGE

SLURRY/SLUDGE ANALYSIS RESULTS

Sample Reference :

PRESELI LIQUID

Sample Matrix : SLURRY/SLUDGE

Laboratory References

| | |
|---------------|-------|
| Report Number | 83781 |
| Sample Number | 91084 |

| | |
|---------------|-------------|
| Date Received | 17-JAN-2020 |
| Date Reported | 23-JAN-2020 |

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) | 42.3 | mg/kg |
| Total Iron (Fe) | 290 | 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) | 0.46 | mg/kg |
| Total Chromium (Cr) | 0.32 | mg/kg |
| Total Sodium (Na) | 14.0 | mg/kg |
| pH 1:6 [Fresh] | 6.61 | |
| Total Aluminium | 2550 | mg/kg |

Released by Myles Nicholson

Date 23/01/20



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PRESELI WTW
PRESELI
PEMBROKE

SLUDGE

SLURRY/SLUDGE ANALYSIS RESULTS

Sample Reference :

PRESELI LIQUID

Sample Matrix : SLURRY/SLUDGE

Laboratory References

| | |
|---------------|-------|
| Report Number | 83781 |
| Sample Number | 91084 |

| | |
|---------------|-------------|
| Date Received | 17-JAN-2020 |
| Date Reported | 23-JAN-2020 |

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 Arsenic (As) | <0.5 | mg/kg |

Released by Myles Nicholson

Date 23/01/20

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS
Tel: +44 (0) 1344 886338 **Fax:** +44 (0) 1344 890972 **Email:** enquiries@nrm.uk.com **www:** nrm.uk.com

DCWW Potable Water Treatment Sludge

Analysis of Preseli liquid sludge

Date: 23/01/20

Lab report no. 83781

Lab sample no. 91084

Application rate (t/ha) 250
 Application rate (t/acre) 100
 pH 6.61
 Dry solids (%) 1.58

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|--|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.02 | % | 0.20 | 50.0 | 0.03 | 6.3 |
| Ammonium-N | 25 | mg/kg | 0.03 | 6.3 | | |
| Phosphorus (P) | 79.4 | mg/kg | 0.08 | | | |
| Phosphate (P ₂ O ₅) | | | 0.18 | 45.3 | 0.04 | 9.1 |
| Potassium (K) | 10 | mg/kg | 0.01 | | | |
| Potash (K ₂ O) | | | 0.01 | 3.0 | 0.00 | 0.6 |
| Magnesium (Mg) | 15.5 | mg/kg | 0.02 | | | |
| Magnesium (MgO) | | | 0.02 | 6.2 | 0.00 | 1.2 |
| Sulphur (S) | 170 | mg/kg | 0.17 | | | |
| Sulphur (SO ₃) | | | 0.43 | 106.3 | 0.09 | 21.3 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Rate | | Limit |
|----------------|--------|-------|-----------|----------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 2.91 | mg/kg | 2.91 | 0.73 | 15.00 |
| Copper | 0.46 | mg/kg | 0.46 | 0.12 | 7.50 |
| Nickel | 0.46 | mg/kg | 0.46 | 0.12 | 3.00 |
| Lead | 0.5 | mg/kg | 0.50 | 0.13 | 15.00 |
| Cadmium | 0.01 | mg/kg | 0.01 | 0.00 | 0.15 |
| Chromium | 0.32 | mg/kg | 0.32 | 0.08 | 15.00 |
| Mercury | 0.05 | mg/kg | 0.05 | 0.01 | 0.10 |
| Arsenic | 0.50 | mg/kg | 0.50 | 0.13 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 2550 | mg/kg | 2550.0 | 637.5 | |
| Iron | 290 | mg/kg | 290.0 | 72.5 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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Sample Analysis Report

| | | | |
|----------------------------|-----------|---------------------|----------------------------------|
| Sampling Point No - | 100519 | Location - | STRATA FLORIDA WTW SLUDGE TANKER |
| Date Sampled - | 04-Feb-20 | Time Taken - | 20:04 |
| Originator - | SEWAGE | Purpose - | EQO/DIRECTIVE COMPLIANCE |
| Laboratory - | GLASLYN | Lab Ref No - | S 6614675 |
| Sampler - | EXTA | No Results - | 20 |
| Type - | | | |

Sample Results

| Code | Determinand Name | Units | Result | Limit |
|------|---------------------|----------|---------|-------|
| 238 | Magnesium | MG/KG | 253 | |
| 288 | ALUMINIUM (DRY WT) | MG/KG | 134000 | |
| 357 | ARSENIC (DRY WT) | MG/KG | 39.5 | |
| 4620 | pH | PH UNITS | 6.2 | |
| 7774 | WTW MERCURY TOTAL | MG/KG | LT 0.28 | |
| 8241 | LOSS ON IGNITION | % | 60.9 | |
| 9233 | Ammoniacal nitrogen | MG/KG | LT 271 | |
| 9234 | Sulphur | MG/KG | 5020 | |
| 9271 | Cadmium | MG/KG | 0.44 | |
| 9272 | CHROMIUM TOTAL | MG/KG | 7.81 | |
| 9273 | Copper | MG/KG | 21.7 | |
| 9275 | Nickel | MG/KG | 9.3 | |
| 9276 | LEAD TOTAL | MG/KG | 58.3 | |
| 9277 | ZINC TOTAL | MG/KG | 100 | |
| 9278 | IRON TOTAL | MG/KG | 24200 | |
| 9281 | % Dry solids | % | 7.23 | |
| 9282 | % Minerals | % | 39.1 | |
| 9283 | % K (dry weight) | % | 0.012 | |
| 9284 | % P (dry weight) | % | 0.28 | |
| 9285 | % N (dry weight) | % | 0.763 | |

DCWW Potable Water Treatment Sludge

Analysis of Strata Florida liquid sludge

Date: 04/02/20

Lab ref no. S 6614675

| | |
|---------------------------|------|
| Application rate (t/ha) | 162 |
| Application rate (t/acre) | 65 |
| pH | 6.2 |
| Dry solids (%) | 7.2 |
| Organic matter (%) | 60.9 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|----------------------------|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.76 | % | 0.55 | 89.4 | 0.02 | 3.2 |
| Ammonium-N | 271 | mg/kg | 0.02 | 3.2 | | |
| Phosphorus (P) | 2800 | mg/kg | 0.20 | 32.8 | | |
| Phosphate (P2O5) | | | 0.46 | 74.8 | 0.1 | 15.0 |
| Potassium (K) | 120 | mg/kg | 0.01 | 1.4 | | |
| Potash (K2O) | | | 0.01 | 1.7 | 0.0 | 0.3 |
| Magnesium (Mg) | 253 | mg/kg | 0.02 | 3.0 | | |
| Magnesium (MgO) | | | 0.03 | 4.7 | 0.0 | 0.9 |
| Sulphur (S) | 5020 | mg/kg | 0.36 | 58.8 | | |
| Sulphur (SO ₃) | | | 0.91 | 147.0 | 0.1 | 14.7 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 100.0 | mg/kg | 7.2 | 1.17 | 15.00 |
| Copper | 21.7 | mg/kg | 1.57 | 0.25 | 7.50 |
| Nickel | 9.3 | mg/kg | 0.67 | 0.11 | 3.00 |
| Lead | 58.3 | mg/kg | 4.22 | 0.68 | 15.00 |
| Cadmium | 0.44 | mg/kg | 0.03 | 0.01 | 0.15 |
| Chromium | 7.8 | mg/kg | 0.56 | 0.09 | 15.00 |
| Mercury | 0.3 | mg/kg | 0.02 | 0.00 | 0.10 |
| Arsenic | 39.5 | mg/kg | 2.86 | 0.46 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 134000 | mg/kg | 9688.2 | 1569.5 | |
| Iron | 24200 | mg/kg | 1749.7 | 283.4 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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DCWW Potable Water Treatment Sludge

Analysis of Strata Florida liquid sludge

Date: 04/02/20

Lab ref no. S 6614675

| | |
|---------------------------|------|
| Application rate (t/ha) | 245 |
| Application rate (t/acre) | 98 |
| pH | 6.2 |
| Dry solids (%) | 7.2 |
| Organic matter (%) | 60.9 |

NUTRIENT CONTENT

| TOTALS | result | units | Total | | Available | |
|----------------------------|--------|-------|------------|----------|------------|----------|
| | | | (kg/tonne) | (kg/ha) | (kg/tonne) | (kg/ha) |
| Nitrogen (N) | 0.76 | % | 0.55 | 135.2 | 0.02 | 4.8 |
| Ammonium-N | 271 | mg/kg | 0.02 | 4.8 | | |
| Phosphorus (P) | 2800 | mg/kg | 0.20 | 49.6 | | |
| Phosphate (P2O5) | | | 0.46 | 113.1 | 0.1 | 22.6 |
| Potassium (K) | 120 | mg/kg | 0.01 | 2.1 | | |
| Potash (K2O) | | | 0.01 | 2.6 | 0.0 | 0.5 |
| Magnesium (Mg) | 253 | mg/kg | 0.02 | 4.5 | | |
| Magnesium (MgO) | | | 0.03 | 7.2 | 0.0 | 1.4 |
| Sulphur (S) | 5020 | mg/kg | 0.36 | 88.9 | | |
| Sulphur (SO ₃) | | | 0.91 | 222.3 | 0.1 | 22.2 |

POTENTIALLY TOXIC ELEMENTS

| TOTALS | result | units | Amount | | Limit |
|----------------|--------|-------|-----------|---------|------------|
| | | | (g/tonne) | (kg/ha) | (kg/ha/yr) |
| Zinc | 100.0 | mg/kg | 7.2 | 1.77 | 15.00 |
| Copper | 21.7 | mg/kg | 1.57 | 0.38 | 7.50 |
| Nickel | 9.3 | mg/kg | 0.67 | 0.16 | 3.00 |
| Lead | 58.3 | mg/kg | 4.22 | 1.03 | 15.00 |
| Cadmium | 0.44 | mg/kg | 0.03 | 0.01 | 0.15 |
| Chromium | 7.8 | mg/kg | 0.56 | 0.14 | 15.00 |
| Mercury | 0.3 | mg/kg | 0.02 | 0.00 | 0.10 |
| Arsenic | 39.5 | mg/kg | 2.86 | 0.70 | 0.70 |
| Other Elements | | | | | |
| Aluminium | 134000 | mg/kg | 9688.2 | 2373.6 | |
| Iron | 24200 | mg/kg | 1749.7 | 428.7 | |

To convert from kg/tonne to units/ton multiply by 2

To convert from kg/ha to units/acre multiply by 0.8

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ANALYTICAL REPORT

| | | | | | |
|---------------|-------------|------|----------------------|--------|-----------|
| Report Number | 89370-20 | V724 | RICHARD EVANS | Client | TYN Y CWM |
| Date Received | 25-FEB-2020 | | 4 RECYCLING LTD | | LLANSAWEL |
| Date Reported | 26-FEB-2020 | | CONTROL HOUSE | | LLANDEILO |
| Project | SOIL | | A1 BUSINESS PARK | | SA19 7PQ |
| Reference | TYN Y CWM | | KNOTTINGLEY ROAD | | |
| Order Number | | | KNOTTINGLEY WF11 0BU | | |

| Laboratory Reference | SOIL471541 | SOIL471542 | SOIL471543 | SOIL471544 | SOIL471545 | SOIL471546 | SOIL471547 | SOIL471548 | | SOIL471550 |
|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|------|------------|
| Sample Reference | FIELD 1 | FIELD 2 | FIELD 3 | FIELD 4 | FIELD 5A | FIELD 5B | FIELD 6 | FIELD 7 | | FIELD 9 |
| Determinand | Unit | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| pH water [1:2.5] | | 7.0 | 6.8 | 6.8 | 7.0 | 6.9 | 6.7 | 6.9 | 6.6 | 6.7 |

| Notes | |
|------------------|---|
| Analysis Notes | <p>The sample submitted was of adequate size to complete all analysis requested.</p> <p>The results as reported relate only to the item(s) submitted for testing.</p> <p>The results are presented on a dry matter basis unless otherwise stipulated.</p> |
| Document Control | This test report shall not be reproduced, except in full, without the written approval of the laboratory. |

| | |
|-------------|--|
| Reported by | <p>Gina Graham</p> <p>Natural Resource Management, a trading division of Cawood Scientific Ltd.</p> <p>Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS</p> <p>Tel: 01344 886338</p> <p>Fax: 01344 890972</p> <p>email: enquiries@nrm.uk.com</p> |
|-------------|--|



| ANALYTICAL REPORT | | | | | | | | | | |
|------------------------------|----------------|------------|----------------------|------------|-----------------------|------------|------------|------------|------------|------------|
| Report Number | 84505-20 | V724 | RICHARD EVANS | | Client TYN Y CWM FARM | | | | | |
| Date Received | 23-JAN-2020 | | 4 RECYCLING LTD | | LLANSAWEL | | | | | |
| Date Reported | 28-JAN-2020 | | CONTROL HOUSE | | LLANDEILO | | | | | |
| Project | SOIL | | A1 BUSINESS PARK | | SA19 7PQ | | | | | |
| Reference | TYN Y CWM FARM | | KNOTTINGLEY ROAD | | | | | | | |
| Order Number | | | KNOTTINGLEY WF11 0BU | | | | | | | |
| Laboratory Reference | | SOIL467466 | SOIL467467 | SOIL467468 | SOIL467469 | SOIL467470 | SOIL467471 | SOIL467472 | SOIL467473 | SOIL467475 |
| Sample Reference | | FIELD 1 | FIELD 2 | FIELD 3 | FIELD 4 | FIELD 5A | FIELD 5B | FIELD 6 | FIELD 7 | FIELD 9 |
| Determinand | Unit | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| pH water [1:2.5] | | | | | | | | | | |
| Available Phosphorus (Index) | mg/l | 26.4 (3) | 27.4 (3) | 16.0 (2) | 38.4 (3) | 23.8 (2) | 26.0 (3) | 34.8 (3) | 23.4 (2) | 13.0 (1) |
| Available Potassium (Index) | mg/l | 66.1 (1) | 123 (2-) | 40.7 (0) | 277 (3) | 35.5 (0) | 52.8 (0) | 110 (1) | 81.8 (1) | 65.3 (1) |
| Available Magnesium (Index) | mg/l | 87.6 (2) | 88.3 (2) | 347 (5) | 106 (3) | 60.7 (2) | 53.4 (2) | 123 (3) | 100 (2) | 60.3 (2) |
| Total Copper | mg/kg | 24.3 | 23.5 | 23.5 | 18.9 | 20.6 | 20.8 | 23.4 | 25.4 | 21.5 |
| Total Zinc | mg/kg | 124 | 121 | 96.9 | 99.6 | 108 | 112 | 115 | 123 | 110 |
| Total Lead | mg/kg | 42.2 | 45.2 | 37.8 | 29.0 | 42.6 | 30.0 | 36.1 | 40.4 | 29.6 |
| Total Arsenic | mg/kg | 19.0 | 19.8 | 16.1 | 17.4 | 18.3 | 14.7 | 26.0 | 29.1 | 16.4 |
| Total Cadmium | mg/kg | 0.32 | 0.31 | 0.35 | 0.30 | 0.39 | 0.29 | 0.36 | 0.37 | 0.33 |
| Total Nickel | mg/kg | 28.7 | 27.8 | 21.4 | 19.6 | 26.5 | 27.1 | 26.8 | 30.6 | 26.3 |
| Total Chromium | mg/kg | 32.4 | 30.7 | 28.8 | 27.9 | 30.4 | 28.4 | 32.6 | 36.9 | 32.9 |
| Total Mercury | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Total Selenium | mg/kg | 0.65 | 0.70 | 0.62 | 0.60 | 0.81 | 0.66 | 0.85 | 0.99 | 0.61 |
| Total Molybdenum | mg/kg | 1.3 | 1.4 | <1 | 1.4 | <1 | 1.0 | 1.3 | 1.3 | <1 |
| Fluoride | mg/kg | 11.2 | 10.1 | 18.4 | 13.8 | 32.3 | 25.4 | 21.0 | 27.3 | 14.8 |

Notes

Analysis Notes

The sample submitted was of adequate size to complete all analysis requested.

The results as reported relate only to the item(s) submitted for testing.

The results are presented on a dry matter basis unless otherwise stipulated.

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ANALYTICAL REPORT

| | | | | | |
|---------------|----------------|------|----------------------|--------|----------------|
| Report Number | 84506-20 | V724 | RICHARD EVANS | Client | TYN Y CWM FARM |
| Date Received | 23-JAN-2020 | | 4 RECYCLING LTD | | LLANSAWEL |
| Date Reported | 28-JAN-2020 | | CONTROL HOUSE | | LLANDEILO |
| Project | SOIL | | A1 BUSINESS PARK | | SA19 7PQ |
| Reference | TYN Y CWM FARM | | KNOTTINGLEY ROAD | | |
| Order Number | | | KNOTTINGLEY WF11 0BU | | |

| Laboratory Reference | | SOIL467476 | SOIL467477 | SOIL467478 |
|------------------------------|-------|------------|------------|------------|
| Sample Reference | | FIELD 10 | FIELD 11 | FIELD 12 |
| Determinand | Unit | SOIL | SOIL | SOIL |
| pH water [1:2.5] | | 5.5 | 6.0 | 6.0 |
| Available Phosphorus (Index) | mg/l | 20.6 (2) | 13.6 (1) | 15.8 (2) |
| Available Potassium (Index) | mg/l | 50.0 (0) | 69.7 (1) | 242 (3) |
| Available Magnesium (Index) | mg/l | 70.5 (2) | 72.3 (2) | 133 (3) |
| Total Copper | mg/kg | 18.6 | 22.0 | 21.9 |
| Total Zinc | mg/kg | 92.6 | 111 | 101 |
| Total Lead | mg/kg | 31.8 | 32.4 | 34.2 |
| Total Arsenic | mg/kg | 17.1 | 21.9 | 24.2 |
| Total Cadmium | mg/kg | 0.35 | 0.30 | 0.35 |
| Total Nickel | mg/kg | 22.5 | 28.7 | 25.7 |
| Total Chromium | mg/kg | 27.4 | 35.2 | 32.8 |
| Total Mercury | mg/kg | <0.2 | <0.2 | <0.2 |
| Total Selenium | mg/kg | 1.15 | 0.70 | 0.69 |
| Total Molybdenum | mg/kg | <1 | 1.1 | 2.2 |
| Fluoride | mg/kg | 27.2 | 15.3 | 17.4 |

| Notes | |
|------------------|---|
| Analysis Notes | <p>The sample submitted was of adequate size to complete all analysis requested.</p> <p>The results as reported relate only to the item(s) submitted for testing.</p> <p>The results are presented on a dry matter basis unless otherwise stipulated.</p> |
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This is to certify that

Richard Evans

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Recycling Waste to Land Training

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At: 4R Newent Office

Date: 22/02/18

Trainer's Name: Dr Becky Wheeler

Training Organisation: In-House

Renewal Date: Ongoing

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