

# North West Nutrients and Resources Network



## TECHNICAL NOTE 1: BIOSOLIDS

Tuesday 22 July 2014 Davyhulme WwTW,  
Urmston, Manchester M41 7JB  
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**Biosolids Definition: Solid or semisolid organic material obtained from treated wastewater, often used as a fertiliser or soil amendment. Biosolids can be produced in cake, granular, pellet or liquid form.**

Harry Mansfield of United Utilities delivered a talk to the group about the history of Davyhulme Waste Water Treatment Works which has been on site for 100 years.

He talked about recycling processes which creates various organic products from sludge treatment works and in particular the Thermal Hydrolysis Process that produces enhanced Biosolids at Davyhulme.

### Davyhulme Factoids

- Davyhulme WwTW processes 40% of UU's sludge waste
- 340,000 tonnes of cake produced annually
- Spreads Biosolids on 17,000 hectares covering 3,000 fields on 500 farms



## Davyhulme Thermal Hydrolysis Plant Tour

The delegates had the opportunity to take a tour of the CAMBI Thermal Hydrolysis Plant. Thermal hydrolysis process (THP) is a two-stage process combining high-pressure boiling of sludge followed by a rapid decompression. This combined action sterilises the sludge producing a Pathogen-Free and enhanced product. The biosolid product is then landspread to arable and grassland mainly in the North West.

The Cambi THP plant is combined with a cogeneration plant, which produces green electricity and provides hot steam for the Thermal Hydrolysis Process.

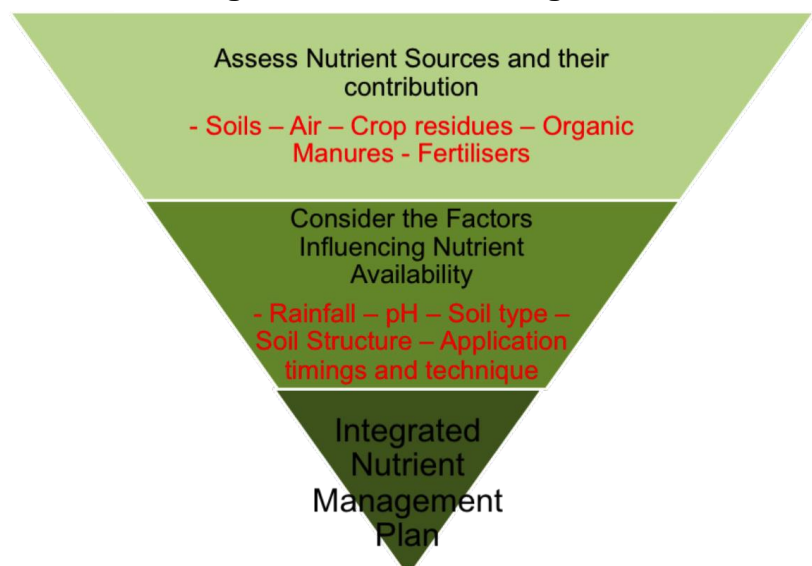


## Future Events

This note supports the series of technical events running across the North West during 2014 as part of the Nutrient and Energy Network. The project is a collaboration between Promar and SAC Consulting and is funded by Rural Development Programme for England.

The objective of the project is the continuation and development of a network that retains and builds capacity for nutrient management and resource efficiency advice to livestock farmers in North West England.

## Diagram showing the process of Integrated Nutrient Management



## Integrating Biosolid Applications into your Nutrient Management Plan

When planning biosolid applications a full integrated nutrient management approach should be taken. Integrated Nutrient management is a system used by farmers and advisors to manage the amount, form, placement, and timing of the application of nutrients. An integrated Nutrient Management Plan takes a field by field approach and considers the supply of nutrients from soils, air, crop residues, manures, wastes including biosolids and fertilisers.

The aim is to supply plant nutrients for optimum forage and crop yields, to minimize nonpoint source pollution, to maintain and/or improve the condition of soil and to maximise the use of home produced manures and limit the need for bagged fertiliser

### Types of Biosolids

As a requirement of The Safe Sludge Matrix, sewage sludge is treated by processes to generate either conventional or enhanced biosolids products, which are suitable for recycling to agricultural land. Conventionally treated sludge has been subject to a defined treatment process and standards that ensure at least 99% of pathogens have been destroyed. Enhanced treated sludge will be free from Salmonella and will have been treated so as to ensure that 99.9999% pathogens have been destroyed. The use of untreated sludge on agricultural land is not permitted. Liquid biosolids can also be produced through the process of anaerobic digestion and please see technical note 2 for further details.

### Benefits of Biosolids

**1. Nutrient Value:** Biosolids are a valuable source of nutrients. They are a good source of nitrogen, phosphorous and sulphur and contain magnesium, potassium and various trace elements. Biosolids can contribute to nutrient requirement of growing crops and even replace the need for bagged fertiliser.

**2. Soil Conditioner.** Biosolids contain organic matter which is useful in improving soil structure, drainage and available water holding capacity. This in turn aids root development and therefore crop resilience to droughts and disease.

**Biosolids Nutritional Value and financial value** (Ref. RB209 Fertiliser Manual 8th Edition) Biosolids have significant value but only if the crop requires the nutrients being applied and other fertiliser applications are adjusted accordingly. *N.B: Values of nutrient varies as fertiliser prices fluctuate*

BIO-SOLIDS (Digested Cake)	Available Nutrient Content kg/ton	Approximate Value/ton
N	1.6 (varies according to application technique, timing, soils)	- 1.29£ 1.61£
P	9	7.35£
K	0.5	0.29£

### Biosolids and their application

Biosolids can be applied to land by different methods. The suitability of methods is governed by the type of land and the consistency of the biosolids as well as environmental considerations for example concerns over odours or runoff. Biosolids can be injected into the soils using specialist machinery (liquid biosolids) or surface applied and incorporated using conventional farm machinery.

**Biosolids and legislation** - Biosolids need to be applied to land in accordance with the following regulations and best practice guidance:

- [Biosolids Nutrient Management Matrix](#) (2014)
- The Sludge (Use in Agriculture) (Amendment) Regulations 1990;
- [Code of Practice for Agricultural Use of Sewage Sludge](#) (1996);
- The ADAS [Safe Sludge Matrix](#) (2001);
- Cross Compliance Single Payment Scheme – SMR3;
- The Nitrates Regulations (2008; 2013);
- [Codes of Good Agricultural Practice](#);
- [Statutory Management Requirements](#)
- Defra [Fertiliser Manual](#) (RB209) – 8th edition;
- EA Technical Guidance Note EPR 8.01.
- [Biosolids and the need for Potash](#)
- European Commission website page on the [Nitrates Directive](#)
- [Recycling of Biosolids to Agricultural Land](#)

Biosolids Nutrient Management Matrix

ADAS soil P Index	Maximum potential application of <i>lime stabilised</i> biosolids <sup>a</sup>	Maximum potential application of <i>all</i> other biosolids types
0/1/2	250kg/ha total N in any twelve month period	250kg/ha total N in any twelve month period
3	250 kg/ha total N in any twelve month period - application 1 year in 4 on sandy soils and 1 year in 2 on all other soils	250 kg/ha total N in any twelve month period - application 1 year in 2 on sandy soils <sup>b</sup>
4	250 kg/ha total N in any twelve month period - application 1 year in 5 on sandy soils and 1 year in 3 on all other soils	250 kg/ha total N in any twelve month period - application 1 year in 4 on sandy soils <sup>c</sup> and 1 year in 2 on all other soils
5 and above	No application	No application

<sup>a</sup> Lime addition rate >5% w/w on a dry solids basis

<sup>b</sup> Composted biosolids can be applied annually and <sup>c</sup> can be applied 1 year in 2

Biosolids currently attached to cross compliance Statutory Management Requirement (SMR) No.3 – Sewage Sludge “*You must take account of the nutrient needs of the plants when applying sewage sludge*” but changes to Cross Compliance in 2015 may remove this as a standalone SMR.