

Bentotex

Case Study: Fernhill Farm

Client

Fernhill Farm

Site

Fernhill Farm
Cheddar Road
Compton Martin
Bristol
BS40 6LD

Application

Constructed Wetland

Project

Construction of a multi-species, soil-based Wetland Ecosystem Treatment or WET System for wastewater purification

Contracting Consultant

Biologic Design
Archenhills
Stanford Bishop
Bringsty
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The Fernhill Farm site is in a very sensitive ecological area; it is in the middle of the Mendip Hills (AONB) Area of Outstanding Natural Beauty as well as being in Bristol Water's SP3 catchment area - a very sensitive aquifer where water is abstracted to supply the reservoirs for Bristol.

Fernhill Farm is a working beef and sheep farm; it also has a listed farmhouse. This is being rebuilt and part of a set of curtilage farm buildings are being converted into a 32 bed camping barn facility. Once these facilities are occupied there will be a big increase in wastewater production - around 5m³ per day. The development already has a large 110,000ltr septic tank installed; however in an effort to create a sustainable resource, with support from Mendip Hills AONB, and in consultation with the Environment Agency plans were drawn up for construction of a WET System (a constructed wetland ecosystem) for wastewater purification.

This will have several benefits:

- Reduced costs and environmental impact of the road haulage to dispose of wastewater - at the Bristol Sewage Works nearly 15 miles away.
- Creation of enhanced biodiversity and a totally new wetland habitat on the farm.
- Educational use, to demonstrate a sustainable method of natural wastewater purification.
- The creation of a renewable resource from the wastewater, in the form of the coppiced willow wands which will be harvested from the WET System site for use in basketry, hurdle making and living willow windbreaks and structures on the site as well as biomass to power the new biomass boiler which has been installed for the camping barn.
- Overall the environmental impact will be very positive.

In order for the WET System to be totally contained, to be a total absorption system and have no outfall - as was required by the Environment Agency, it was calculated that it would need to be 0.7ha (approx 90m x 60m) and be planted with over 10,000 willows - to be managed as short rotation coppice.



Geosynthetics

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Bentotex Applications

- Lagoons
- Landfill lining and capping
- Ponds

Products used:

31 rolls of Bentotex GCL100 5m x 40m rolls

6 rolls of DuoDrain GMG412 2m x50m rolls

References:

Biologic Design :
jay@biologicdesign.co.uk

Mendip Hills AONB :
www.mendiphillsaonb.org.uk

Bristol Water :
www.bristolwater.co.uk

Environment Agency :
www.environment-agency.gov.uk



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The major objection, raised by the EA and Bristol Water, to the creation of such a WET System in this location was the existence of an important aquifer below the farm and the worry of cross contamination from the wastewater above leaking and polluting it.

The Geosynthetics **Bentotex GCL100 Geosynthetic Clay Liner** was put forward by Biologic Design as a perfect choice due to its self-healing abilities and the remote nature of the site. The use of our **Bentotex GCL100** meant that the contractor did not need any of the welding machinery, power or geotextile protection fleeces associated with manmade HD/LD liners; it also provided the degree of safety needed for Bristol Water and the EA due to its ability to 'heal' itself.

After providing a study undertaken to assess the effects of root penetration, a method statement and a system of leak detection (incorporating our DuoDrain GMG412 product) were put forward all parties reached consensus and were all happy the products would perform in this demanding application.

The earthworks team quickly evolved ways to use their equipment (13 ton tracked excavators) to install the liner. Even though the installation was undertaken during a period of high winds, horizontal rain, fog and some snow - as well as brilliant sunshine - all quite normal for the Mendips, the installation was completely successful and the WET System was operating, with no leaks, less than 2 weeks after the liner was installed



1
Forming
Bunds



2
Digging
Anchor
Trench



3
Maneuvering
and laying
Bentotex
with a
'spreader
bar'



4
Installing
the leak
detection
layer below
Bentotex



5
Laying the
Bentotex
granules to
seal the
laps.



6
Laying the
Bentotex in
the snow



7
Putting the
required
300mm of
cover over
Bentotex
using as
dug material



8
Covering
Bentotex in
the fog