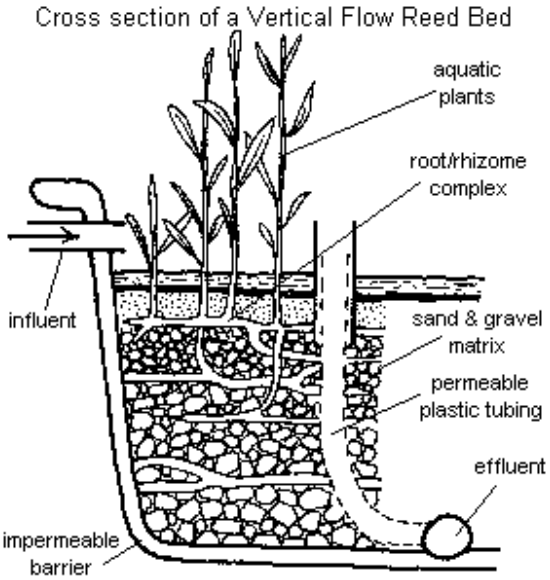
DRAIN TECH PTY LTD

Bioremediation Filters

Fact Sheet # 12

Sub-surface drainage is a fundamental necessity for efficient farming. Nowhere is this more pertinent than in the high rainfall grazing enterprises that are based in the heavy soil districts of South West Victoria. These grazing systems are inherently "leaky" in that high nutrient inputs and high animal by-product outputs are placed into an environment that has high and intense rainfall frequency. This leads to high rates of surface and sub-surface flows from paddocks to local watercourses. Be it diffuse flows from overland discharge or point source from tile drain outlets, the fact remains that landholders need to address the fact that the potential exists for excesses of nutrients, chemicals or wastes to be carried to watercourses if no action is taken.

Constructed wetlands are a new technique being promoted to intercept and treat nutrient removal before drainage water reaches a stream or water body. Constructed wetlands for this purpose can be located within surface drains (i.e. in-stream wetlands) or at the outlets of the drainage network of either surface or, more commonly, of sub-surface drains. Processes such a de-nitification (nitrate being converted to gaseous forms and released to the air), nutrient incorporation into soil organic matter or plant material, settling of P into the sediment layer, and aerobic-anaerobic reactions at the soil/water interface can all lead to nutrient removal. There is also some die-off of faecal microbes when water is held in the wetland for sufficient time.



Annual removal rates of around 20-35% of nitrate and total nitrogen can be expected for a wetland comprising 1% of the drained catchment. Larger wetlands 2-5% of the catchment area can increase removal rates to 40-70%.

The use of low nutrient carbon-rich supplement such as sawdust, woodchips or cereal straw can markedly increase the nitrate removal. Woodchip filters can remove and immobilise a proportion of the nitrogen passing through them, and provide a slow-release of organic matter that promotes bacterial conversion of nitrogen to nitrogen gas. These carbon rich anaerobic environments are excellent at converting a high proportion of nitrogen to inert N2 rather than the greenhouse gas N2O. Constructed wetlands are most efficient where flows variations are not extreme and nitrate loadings are not excessive, so wetlands should be seen as a final buffer and not replace sound management of grazing, nutrient and effluent application on drained land.

more grass less mud ... guaranteed

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Richard Gloyne
388 Curdies River Rd
RMB 2142
Timboon Vic 3268

Phone: 03 5595 0369
Fax: 03 5595 0388
Mobile: 0428 528 054
Email: richard@draintech.net.au