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Chasing environmental performance by I G Richards OBE Master 2013-2014.

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This Perspective describes how novel approaches in dealing with derelict land that posed difficult engineering and environmental problems led to the experience being transferred to great effect into other areas of civil engineering.

The 1970's and 80's saw engineers dealing with the aftermath of industrial decline which produced large areas of land that posed physical, social and environmental threats on communities that lived close by. In the 1980s the British public became increasingly worried about their quality of life and damage to the environment; that worry is even more entrenched in 2013.

Throughout the 1980s I saw and wrote that planners and architects were considered to be and were found guilty by majority verdicts of destroying the quality of our towns and cities. 'Were the juries rigged' or 'were the defences poorly prepared' I asked.

At the same time I was afraid that engineers were to be the 'next in line' and would be heavily criticised for our apparent indifference to the environment in which we worked as well as our complete distrust of professionals in other disciplines. When challenged, engineers and their clients argued that the 1960s and 1970s were times when projects were required quickly, appearance was secondary to function and what was this expensive 'environmental thing' that people had begun talking about. It was clear to me that engineers needed to acknowledge that environmental issues would soon test their understanding of the natural world and their ability to survive in a new climate.

I argued that when specialist knowledge was applied early enough beneficial environmental features could be integrated into conventional engineering approaches without anyone suffering excessive additional costs; but new thinking, techniques and approaches would be required.

I based my argument on the experience gained in rehabilitating derelict and abandoned land which was often inhospitable to many plants, especially exotic grasses, trees and shrubs that were drawn from suppliers' catalogues and commonly specified in construction contracts. These derelict sites had to be made attractive to local residents as well as would-

be developers. Vegetation that was growing successfully spelt out good long-term intentions on the part of the land owners. The objectives in 'greening' a site were not as straightforward as they might have seemed to the casual observer.

Few engineers appreciated that a freshly regraded highway slope that had been dressed with top-soil could be as inhospitable as any derelict site, especially when soil had been stored for some time, when no regard had been taken of slope steepness, soil profile, aspect, soil quality, local vegetation that was surviving quite happily, the seasons of the year when the work was carried out and the concept of applying an appropriate management regime over several years. "You mean you want us to spend money AFTER the job is complete?" was a common and hostile reaction. In many cases management programmes were deleted due to over-runs of costs in other parts of the project despite what was required in the contract; everyone's reputation suffered and to my certain knowledge many engineers instinctively felt that there had to be a better way of doing things.

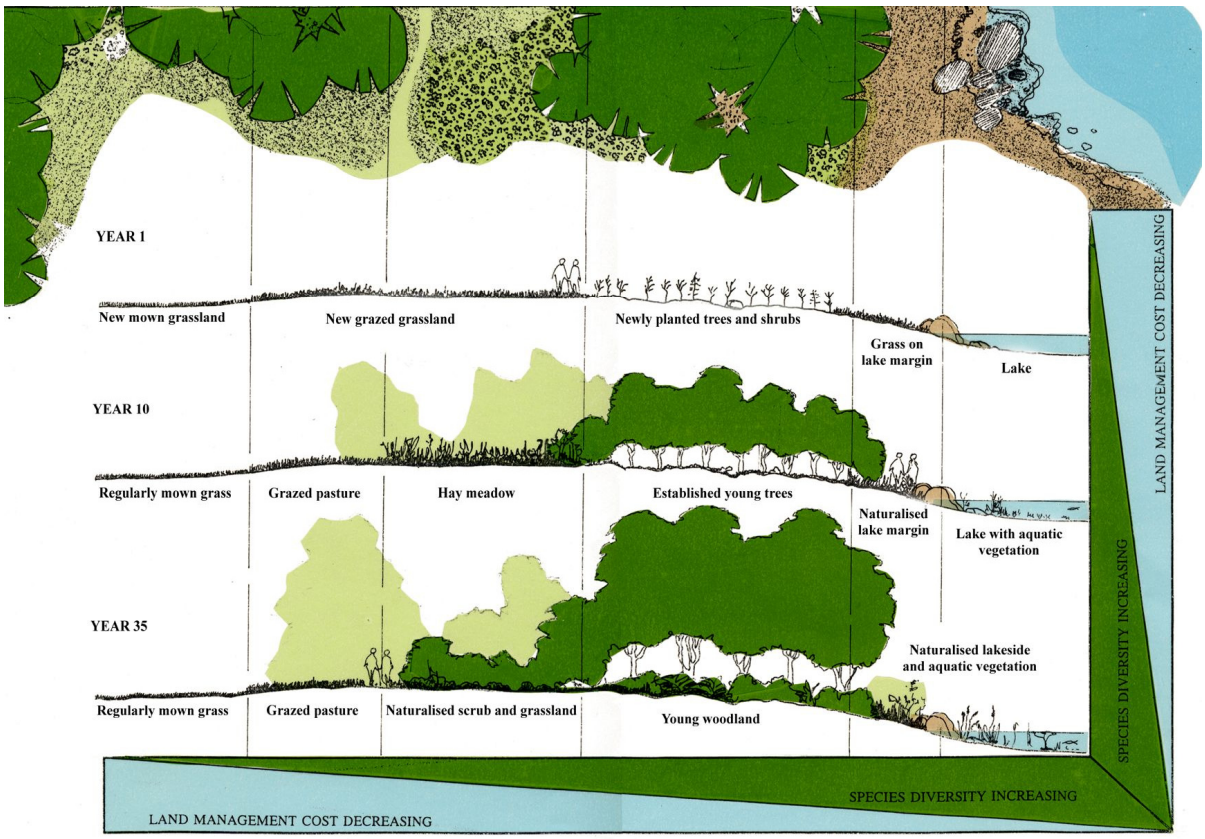
A common highway scar in hilly areas.

An opportunity for change presented itself.

I was asked quite specifically by a landscape specialist in a government department to find out 'What is going wrong.' Assessing the problem of what was going wrong when, for example, vegetation on new highway slopes did not perform as expected by simply failing to grow, led to a general review of how the establishment of vegetation could be better understood by engineers. At the time engineers knew very little about soil and even less about vegetation. It was pointed out that site; soil and vegetation were intrinsically linked and designs need to respect this link from the outset. I stressed the importance of managing a raw and young cover of vegetation with care and understanding. Importance was placed on including a secure allowance for management using appropriate equipment and materials; all of which would lead to a long-term improvement in performance.

A change of thinking and practice was required which had to be appropriate in a civil engineering world.

The diagram below illustrates how management and site-use can be accommodated in an overall plan. These practical ideas were seen as ones that could be quickly assimilated into engineers' thinking and divert criticism away from the industry as well as develop reputations for carrying out work in a sensitive way. Environmental specialists, a new breed of busy-bodies in the view of most civil engineers at the time, needed convincing too that engineers were interested and could produce such work.



Principles of Landscape Management

This diagram is derived from one that illustrated the processes on a regraded derelict site where landscape development would be slow and deliberate; where soil fertility was too small to measure, where an appropriate soil structure had to be developed using civil engineering machines and methods and plant development would be controlled by careful use of alternative fertilisers to manage diversity and costs. These latter elements are attributes that are much admired today. A plan could extend over many years and dispelled the idea of an immediate 'bowling green' finish that some expected, indeed might have been promised.

I suggested that each site has its own unique qualities and difficulties but provided that these are understood, through characterisation of a site rather than the previously restricted approach adopted by engineers, then civil engineers and their multi-disciplined colleagues could meet environmental aspirations. Today this approach is obligatory when works involve disturbance of soil or vegetation.

The challenge to improve practice was recognised, a creative response developed and this was backed by an emotional reaction in engineers who wanted to improve their performance.