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Self Cleaning Detention Basins - Serious Savings and a Lighter Hand on the Sediment Budget

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Biography:
Since 2005 Jason Cooper has worked in roles related to stormwater and flood risk management at Wollongong Council. He brought to this role substantial experience in asset management, construction, and design in both private and public sectors.

Jason came to engineering after a successful career as a chef. His growth in the practice definitely demonstrates creative flair together with an appreciation that relationships between the people, practices, technologies, and supporting earth systems which comprise engineering are where the real magic happens. His relentless innovation is focussed by a vision to explore ways by which a better understanding of these relationships could help us to adapt the demands of human societies to integrate more harmoniously with our environment.

To best manage our relationship with catchments we must recognise that not all sediment is bad sediment.

Natural sediment includes a range of particle sizes and properties which the river sorts and distributes into structures which capture fines and stabilise waterways and coastlines. These systems have evolved in response to variability in natural sediment regimes. This means that their current form (which we often rely upon and enjoy) is contingent upon the continuation of these regimes.

The systems which influence supply and transport of natural sediment are complex, fluid, and interrelated as natural systems tend to be. Our current understanding of these systems may not allow us to neutralise our impact entirely, but we know enough to understand that big changes attract big changes so it is a good idea to tread as lightly as we can.

This is a story about how we discovered just how lightly we had not been treading in the relationship between detention basins built for flood mitigation and the catchment systems into which we had built them. It is also a story about us learning more about that particular relationship and leveraging a new respect for our basin's role in context into an innovative solution which reduces the cost of owning the basin both in dollar terms and in terms of its impact on natural sediment transport regimes.

Self-cleaning basin technology is a response to the challenges of owning detention basins in the energetic catchments around Wollongong, which suit basins in a traditional sense as long as you are Ok with them filling up with coarse sediment. Because detention basins provide critical risk management products our traditional response has been to view this simply as a factor that increases the operational cost of the asset.

Recently we have realised that we are paying to dispose of coarse sediment then importing virgin rock with similar properties to provide erosion repair services. Also, that we didn't really have a

handle on how service loss in our basins affected related products like development control and emergency planning. Bringing these problems together through the lens of systems thinking guided us toward a solution which respects and recruits the natural systems inherent to a place rather than opposing them. The resulting technology dramatically reduces cost and risk of basin ownership and keeps the coarse sediment flowing in a regime much closer to that which would have pre-existed the basin.