

Permeable drainage walls combine best of both worlds

An earth retention system manufactured by Rocla has provided the “best of both worlds” for Cairns Regional Council when needing to re-line a 220 metre open drainage channel.

Jaye Street Drain runs through Edge Hill, a heavily populated northern suburb of Cairns, with the Jaye St roadway on one side and a row of properties on the other, and with not much clearance between either the road nor the rear of the properties. Existing drain walls were mostly in a state of collapse.

Parameters considered in the design solution included the footprints of the road, drain and private properties, the capacity of the drain and the velocity of stormwater, as well as cost, construction time and practicality.

Typical concepts considered for surface drain rehabilitation included in-situ cast concrete lining, gabions and reno baskets, and concrete blocks. Gabion and reno baskets were eliminated as an option because, among other things, they were too labour intensive and time consuming to construct in an environment that could be under water every time

Precast manufacturer

Rocla

Client

Cairns Regional Council

Engineer

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it rained. A concrete lined drain was eliminated because the construction would not have fitted easily into the existing drain footprint, in particular it would encroach too closely to the private property boundaries. For example, a concrete lined drain with a 3-metre base and a 45 degree batter would have created a width at the top of the drain of typically 8 metres.



These considerations, with the need to cope with a minimum 1 in 100 year rainfall event, made it clear that the ideal profile of the drain would have walls that were essentially vertical. The Rocla earth retention block system met this requirement. It meant that a wall on the property side could be constructed in front of the existing gabions, requiring little or no extra excavation and consequently had little or no effect on the existing vegetation and infrastructure. It also allowed the drain to be built within the existing footprint, with a bed width of 3.4 metres and a top width of approximately 3.8 metres. The permeability of the system was a bonus, allowing groundwater to flow out into the drain and prevent hydraulic pressure from building up behind the wall. And speed of erection was a further bonus.

Construction Supervisor, Darren Falkiner, and his team of Council day labour staff found the system relatively quick and easy to install. "It offered the best of both worlds," Darren said. "It provided a solid, monumental wall that fitted within the available footprint."

Two 20-tonne excavators, one in the creek bed and one on the roadway, were used to erect the system.

After excavating to the founding layer, geo fabric and a 300-500mm ballast layer was placed and compacted, then bedding sand was levelled and compacted on top to form a base for the precast units.

When the units arrived on a semi-trailer, the excavator on the road passed the blocks down to the excavator in the drain bed for placement on the north side of the channel. The concreters followed behind the excavators, at first placing a blinding layer, principally for erosion control in case of rain. The reinforcement and 150mm slab were then laid, up to the base of the retaining wall and in between the blocks, to lock them into place. No-fines concrete was poured behind the wall for extra stabilisation of the embankments and to fill the voids behind the precast units.

"It was the ideal product for the job," Darren said. "It gave us the ability to work in poor ground quickly, to build a vertical wall with minimal disturbance to properties and the roadway, with a material that is by its nature very durable."