

Cleaning a river

Developer SDB prefers a more creative, and no doubt, more complicated way, of doing things.

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MANY developers would consider a stream running across their property as a liability, and would normally prefer to divert it or pave over it. So, it is a pleasant surprise when a major developer chooses a path less-travelled.

Instead of covering up a small river that runs through its new development called By The Sea at Penang's Batu Ferringhi beach, Selangor Dredging Bhd (SDB) opts to clean and beautify it, turning it into a major landscaping feature of the RM230mil condominium project.

The river, Sungai Satu, originates from the hilly forest reserve upstream and passes through Kampung Mutiara before emptying into the sea. It splits the 1.9ha project site into two.

SDB aims to enhance the land surrounding the river, as well as the water quality of the river that resembles a giant drain during the dry season. To do this, it will construct a weir to slow down the flow of water to encourage sedimentation, and then filter the water through engineered wetlands, before discharging cleaner water downstream.

"If we had concreted it over, there would have been no need to manage things as water would just flow under," said Yeoh Guan Jin, SDB communications and corporate affairs manager.

By opting to turn what could be a liability into an asset, SDB started looking around for consultants with a proven track record in river rehabilitation, and ended up talking with Singapore-based Enviro Pro Green Innovations, which had a hand in transforming a concrete canal (actually Kallang River) in Bishan, Singapore, into a natural-looking river featuring a significant stretch of constructed wetlands.

SDB will work on a 200m stretch of Sungai Satu that passes through its property. It aims to improve the water quality from a Class IV to a Class II, which will make it sufficiently clean for recreational use. A Class IV river is fit only for irrigation. According to Enviro Pro director, Carsten Huttche, water sampling was done for at least six months to determine the baseline water quality of Sungai Satu. It was found that as the river approaches the beach, it has high concentrations of nitrates and ammo-



Clean-up act: Sungai Satu turns murky after passing through houses and the developed areas of Batu Ferringhi, Penang. By installing rubbish booms, weirs and an engineered filtration system, developer Selangor Dredging Berhad aims to clean up the river where it runs through its development site.

nia, in addition to a lot of solids and suspended materials.

Discharges from various sources end up in the 7km-long river – a car wash, a busy coastal road that cuts through the residential and tourist belt of Batu Ferringhi, and at least two hundred units of kampung housing.

The river rehabilitation, estimated to cost RM2mil, involves first removing floating rubbish by installing a floating boom across the river at a point close to Jalan Batu Ferringhi. Floating rubbish will be carted off regularly and this will ensure that the Batu Ferringhi beach remains

clean (other than litter left behind by beach goers).

The second stage of the project involves building two weirs across the river. One is to slow down the flow of water so that suspended solids have time to settle down in a sedimentation bay.

A second weir will be built at the end of the 200m stretch in order to regulate the water level around the constructed wetlands.

The slightly clarified water from the sedimentation bay will be pumped into the constructed wetlands, consisting of various filter media and planted with a wide variety of wetlands vegetation. The water will slowly percolate through the filter, before seeping



A model of By The Sea, showing the 200m stretch of Sungai Satu that passes through the condominium. The 800sqm cleansing wetlands is on the left bank of the river.

back into the river. The role of the plants is to absorb some of the excess nutrients like phosphorus and nitrates.

One aspect of the project is the use of bioremediation; in this case, carefully selected plants. "It is not as simple as placing sand filter and putting in some plants. Everything is designed for a particular purpose, and there is a fair bit of know-how involved," said Huttche.

SDB hopes that the end product will be a river that is clean enough to support an abundance of aquatic life. Currently, only a few giant monitor lizards can be seen prowling in the river.

The challenge for this system is achieving the right balance between the cleansing capacity and maximising land use.

"Everything is integrated, and it is quite a design challenge. We must not increase the risk of flooding, while needing to improve water quality within a background where many pollutant parameters of the Malaysian water quality guidelines have already been exceeded. And the project must add value and enhance the aesthetic appeal," said Huttche.

Tabletop modelling aided by data from the Geographical Information System analysis shows that upstream villages are not at an increased risk of flooding.

Projections show that the river rehabilitation will improve the quality of water downstream of the project.

It will be ready by the end of the year, well ahead of the actual completion of the condominium.



This monitor lizard is one of the few hardy creatures that can survive in the polluted Sungai Satu.



To help clean up Sungai Satu, engineered wetlands consisting of filters and plants will be constructed. They are an adaptation of the system used in Bishan Park, Singapore.