

Pangshan Grove **BRIDGING MAN AND NATURE**

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Images as credited



PROJECT CREDITS

Location: Between Bukit Panjang Ring Road and Jelapang Road **Date Completed:** 2000 **Developer/ Master Planner/ Architect/ Landscape Architect:** Housing and Development Board **Plot Area:** 70,000 m² **Number of Blocks:** 13 **Number of Dwelling Units:** 1,475 **Size of Dry Stream:** Approx. 200 metres long and 3 metres wide

In August 2013, Housing and Development Board (HDB) was conferred the Landscape Excellence Assessment Framework (LEAF) Certification for Pangshan Grove.

In an increasingly concretised city, where buildings dominate, the landscape at Pangshan Grove redefines the experience of landscape in a public housing estate. A dry creek, or man-made stream, enveloped by luscious ferns and overhanging tree branches, runs through the spine of the housing development. On rainy days, the dry creek comes to life as a stream, meandering through a series of rock formations before emptying into a small collection basin at the southern end of the development.

At the time of its design in the 1990s, the idea of introducing water to public housing landscapes had already been conceived. In Pangshan Grove, through careful grading of the ground, surface runoff is directed towards the creek, which in turn channels the water to the lowest level on the site.

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Site Characteristics

Pangshan Grove is located in Bukit Panjang, a town that bears characteristics of its name, "long hill", the literal translation of the Malay words *bukit* and *panjang*. In response to the site's natural sloping terrain, the development was designed to step down gradually towards south, with terracing profiles of the housing blocks reflecting the topography. Thirteen blocks were laid out in two rows along the curves of the site, with a linear landscape space carved out in the centre (Fig. 2, 3). It was this space, coupled with the site's topography, that inspired the landscape architect to envision a stream running through the precinct.

To the east of Pangshan Grove sits the Bukit Panjang Neighbourhood Park. Views of the park can be seen through the interstitial spaces formed between blocks, adding to the overall landscape experience of the precinct.

Design

Stream

Initially, a three-metre-wide concrete drain with rock arrangements was proposed to occupy the central space between the blocks. The landscape architect, however, imagined a stream running through the landscape. To create this man-made stream, it was necessary to understand how streams occur in the natural environment. This included applying knowledge on geology and hydrology.

Essentially, the dry creek serves as a drainage system for the landscape. To create the creek, the earth of the channel, which was originally to be lined with concrete, was covered with steel mesh for reinforcement. A mixture of cement and sand, known as Gunite, was then sprayed on the mesh to bind the materials together and create an uneven texture. To form the embankments, boulders were anchored to the walls of the channel using steel nails, and made complete with the planting of tropical vegetation. This transformed a practical drain into an aesthetic yet functional water element (Fig. 1).

The design of the stream had to negotiate a level difference of nine metres from the northern to southern ends of the site. On the one hand, this posed challenges in creating a landscaped drainage system. On the other, it created opportunities for various natural river features to be explored. At areas where the terrain dips, drops were introduced along the stream, mimicking that of mini waterfalls (Fig. 4). At other parts where the topography was gentler, boulders were placed in the middle of the stream as outcrops, creating rapids similar to white water.

The width of the stream was also widened and constricted at various points to complement the river characteristics envisioned. For example, the width of the stream was narrowed where there were drops in levels, causing water to flow at higher velocities, and adding to the "waterfall" effect. In designing with the existing topography, most contours of the land were preserved.



2

Section of man-made stream (Diagram: Rebecca Sng)



3

Plan of Pangshan Grove (Diagram: Rebecca Sng)



For surface runoff to flow towards the creek, the surrounding grounds were graded, with crevices between the boulders allowing water to reach the creek. At certain points, water entering the stream appears reddish-brown, due to the ferrous oxide compounds present in the surrounding soil (Fig. 5).

Planting

Tropical plants, typically found near water bodies, soften the embankments to create a sense of comfort and mystery. Branches of Willow-like trees, such as *Thevetia peruviana*, hang languorously over the stream, while water plants, like *Cyperus alternifolius*, rest among the rocks to complement them. The plants introduce another dimension to the experience of the landscape, as they not only add to the greenery, but also help to frame and screen views from the main footpath. They also act as a natural safety barrier about the stream (Fig. 7).

To blend the “soft” (plants) and “hard” (rocks) elements seamlessly, planting holes were made in the rocks to hold plants, such as Bird’s Nests Fern. Other types of plants, like *Phyllanthus myrtifolius*, were grown on the adjacent ground and left to drape over the surface of the rocks (Fig. 6, 8).

The landscape is an ever-changing one. With time, as trees take root and shrubs grow, the landscape also matures, evoking different experiences (Fig. 10, 11). Now, more than 10 years since the birth of the precinct, lacy canopies of *Caesalpinia ferrea* trees pattern views of the sky. Scents of freshly cut grass are palpable, with sounds of cascading waters drifting in the air. The overall feeling is one of tranquillity and comfort.

As nature takes its course, little human intervention is required. Shrubs are pruned occasionally and watering is kept to a minimum as the land receives and retains water when it rains. At areas where the ground undulates, groundcovers rather than lawn are used, minimising the need for grasscutting. Leaf litter is also left to collect naturally along the stream, where the dead leaves can help to fertilise the soil as they decompose.

Along with the diverse palette of plant species are the varieties of birds and insects introduced to the precinct. Pangshan Grove is home to more than three species of birds and several other types of

fauna, including butterflies and dragonflies. The biologically diverse landscape reflects the robust state of the environment.

Construction

Throughout the construction process, the project team worked closely with the landscape contractors to bring the plans to fruition. Weekly site inspections were made to supervise the construction and ensure that ideas on the drawing board were implemented as envisioned. As the project straddled three different housing contracts, much coordination between the various contractors was required. This included ensuring consistency in the quality of materials and syncing the scheduled construction works.

Site visits were crucial as the design had to be refined according to how the materials looked on site. When the softscape was installed, plants were first arranged in position based on plans, then adjusted where needed, before they were finally planted. The man-made boulders were also similarly placed and adjusted along the stream based on an understanding of prevailing site conditions, such as the flow paths of water during storm events.

To emulate natural rock formations, contractors sourced for boulders in the surrounding region and cast 20 resin moulds from them. With the negative moulds of natural rocks, boulders were cast using Glass Fibre Reinforced Concrete (GFRC), and sprayed with grey paint of varying intensities to achieve a natural finish. Later on, algae that formed on the boulders was left to grow as part of the natural landscape (Fig. 9).

The end product of the landscape at Pangshan Grove is “man-orchestrated nature”, an introduction of a sinuous channel that carries water from the precinct to the nearby retention pond.

Especially in today’s context, greenery holds far greater significance than mere decoration. It is a key for better well-being, a tool for placemaking, and arguably the template for creating quality living environments. In all HDB developments, greenery plays an important role in enhancing community spaces and creating endearing homes. With the provision of more co-created green spaces, like community gardens, greenery can also give residents a greater sense of rootedness to their homes. 



1. The stream runs along the main spine of the precinct, alongside footpaths and facilities, such as a playground (Photo: Chiau Gao Zheng).

4. Mini waterfalls are created where there are drops in levels (Photo: Rachel Teo).

5. Ferrous oxide present in the soil causes the water to appear reddish-brown (Photo: Rebecca Sng).

6. Plants on the embankments are left to drape over the boulders (Photo: Rebecca Sng).

7. Plants screen the stream from the main footpath and serve as a natural safety barrier (Photo: Rebecca Sng).

8. Planting holes were made in the boulders to hold the vegetation (Photo: Rebecca Sng).

9. Algae forming naturally on the boulders adds to the overall naturalistic environment (Photo: Rebecca Sng).

10. Image of stream shortly after completion in year 2000 (Photo: Tay Bee Choo).

11. Image of the stream today with its matured vegetation and evolved profile (Photo: Chiau Gao Zheng).