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Higher learning

Property prices, high-density residential development and a resurgence in inner-city living have combined to influence major changes in traditional school design. As **Sean McGowan** reports, vertical schools solve the problem of land availability but bring with them challenges more akin to commercial development.

Like many others, I grew up in the outer suburbs within close walking distance to my state primary school.

Built in the 1920s in an area once considered rural, my “alma mater” occupied a 2 hectare site that became surrounded by brick veneer homes on classic “quarter-acre” blocks.



It was an era of urban sprawl when land was both plentiful and relatively inexpensive.

As students, we had oodles of space to play, including a football oval, tan-barked playground, basketball courts and paved areas. And despite the addition of new buildings over the years to cater for increased numbers of students, the school remains much the same today as when I attended.

But in inner suburban locations where higher density living is driving new population growth, the traditional single-level school building model

is no longer viable. The scarcity and affordability of available sites has made it this way.

Such restrictions have given rise to the emergence of vertical schools, such as the new Prahran High School and South Melbourne Park Primary School in Melbourne – both designed by architectural firm Gray Puksand.

“Land availability in developed areas is always scarce,” says Stephen Turner, partner with Gray Puksand.

“Therefore if there is a requirement for schools in these contexts, new models of

educational facilities will emerge, and Prahran High School is the first high school in Victoria to explore this.”

PRAHRAN HIGH SCHOOL

Set to open for the 2019 school year, Prahran High School is a new four-storey vertical high school located on the former Swinburne University site on High Street, Prahran in Melbourne’s inner east.

The design features an open atrium at the centre of the building, contemporary teaching spaces, a main performance space and outdoor terraces on every level.

Prahran High School is a four-level vertical school set to open next year. Image: Gray Puksand.



“The multi-level typology of vertical schools provides an opportunity for a variety of learning spaces that are not found in traditional, single-level schools”

Library, music and drama spaces will be located on the ground floor to utilise the large ceiling heights. The three levels above will house science, art and food technology spaces, taking advantage of the outdoor teaching spaces provided.

General learning, ICT (information and communication technology) and break-out areas are incorporated throughout all levels of the building.

A gymnasium on level three opens out to a large, outdoor recreational zone including rebound court, running track and protective netting. A rooftop play area with trees and a garden provides students space for passive recreation.

“The multi-level typology of vertical schools provides an opportunity for a variety of learning spaces that are not found in traditional, single-level schools,” says Turner.

“For example, social stairs are designed as bleachers and there are elevated external learning decks on all levels adjacent to learning communities and specialist areas. These are two examples of spaces that provide dynamic and purposeful settings for learning.”

Turner says the bleachers encourage collaboration, movement and serendipitous interactions, while the outdoor learning spaces provide for messy market activity and interdisciplinary mixing.

One of the challenges of vertical schools is the encouragement of physical movement – both vertically and horizontally – across the building.

In much the same way as vertical village designs are being used to connect multiple levels of high-rise commercial office buildings, a vertical school needs to accommodate a community of students and educators who need to utilise and collaborate across the entire building.

“Designing spaces that are human-centred and focus on the activities they are used for has resulted in interior typologies that provide a variety of purposeful settings,” says Turner.

“This is true for educational environments and office interiors.”

INDOOR ENVIRONMENTS

Operationally, the vertical school must be user friendly and adaptable. And from a mechanical services perspective, comfortable conditions and high indoor environment quality (IEQ) must be achieved while allowing movement from inside to out.

This is particularly the case in the mechanical services design of Prahran High School.

The multi-level typology of vertical schools provides for a variety of learning spaces.
Image: Gray Puksand.



“The connection between IEQ and educational outcomes is well understood, in a similar fashion to IEQ and productivity in a commercial office setting,” says Glenn Alman, Affil.AIRAH, principal and project

engineer (mechanical and sustainability) for Wood & Grieve Engineers.

Although the traditional school design hasn’t always addressed IEQ to the level it should, Alman says vertical schools have facilitated a rethink and

allow an approach that supports learning outcomes through IEQ.

“Providing the right amount of outside air into the building has become a significant driver in the design of the school,” he says.



“Classroom population rates are potentially higher than a traditional commercial office environment, and as such the demand for outside air is high.”

For projects such as Prahran High School, pre-treatment air-handling

systems are typically being used to deliver conditioned air to each zone. Local fan-coil units can then respond to the load within each space, providing each classroom or zone with a level of individual comfort.

The use of variable-speed systems and CO₂ control is used to ensure building energy efficiency is maintained and systems only operate when required.

Alman says the HVAC design for vertical schools more closely resembles a commercial office space than a typical suburban school environment.

“Combined with the density of the space, inner-city design issues – such as concerns over local pollution sources or ambient noise levels – means traditional natural ventilation approaches become limited,” he says.

“The projects we have delivered to date have been delivered as chilled water

Classroom population rates are potentially higher than a traditional commercial office environment, and as such the demand for outside air is high

(CHW) and heating hot water (HHW) designs due to life-cycle limitations of other forms of air conditioning.”



Haileybury's City campus (above and below) in Melbourne occupies a former commercial office site.

VERTICAL GROWTH

Outside of Victoria, a host of other inner-city vertical school projects are being undertaken, with state governments in Queensland, New South Wales and South Australia all committing funds to new vertical school projects.

Among them are the first new schools to be built in Brisbane's inner-city region since the early 1960s – one in South Brisbane and the other, interestingly, on the site of a former state school in Fortitude Valley.

Both are being built under the Queensland state government's \$800 million Building Future Schools program. This recognises that "Queenslanders are changing the way they live and where they choose to live, with more families deciding to embrace inner-city living."

Over the past 10 years, about 5,000 additional students have enrolled in Queensland state schools in, and around, the Brisbane CBD.

According to the government, this growth is set to continue, with more than 3,000 additional students expected to move into inner Brisbane in the next five years.

BACK TO SCHOOL

As well as new builds, pre-loved commercial office buildings are emerging as suitable candidates for vertical schools.

One example of this trend is the Haileybury City Campus, which now occupies a former commercial office building in King Street, West Melbourne.

The 10-storey building was refurbished to accommodate over 700 students from kindergarten to Year 12 level, and opened for the 2017 school year.

In transforming the former call centre into a school, the building interior was redesigned to incorporate a sports

hall, indoor running track and science laboratories. The lower two levels are dedicated to the arts, and feature a performing arts studio.

To enhance the building's IEQ, the existing central chilled water and heating hot water plant was upgraded.

"Due to the existing building design, many existing air-handling units (AHUs) were able to be reused and refurbished as outside air pre-treatment systems," says Alman.

About 1,500m² of recreational green space was also created via terraces on multiple upper levels of the building. ■

