

GETTING THERE | CHAPTER 9

Farrer Park station

Farrer Park was once Singapore's premier sporting venue. Run by the Singapore Sports Council, the park's facilities supported both competitors and enthusiasts across various sports, most notably football, and was the nurturing ground for some of Singapore's best sporting talent. Today, a new HDB estate and several commercial development projects see Farrer Park running at a different pace.

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Farrer Park – The mere mention of the name conjures up images of raucous games of football, deft players and frenzied fans. This park has been described as Singapore’s most cherished and hallowed of soccer grounds. It was there that a number of footballers made their start: the late Rahim Omar, Asian All-Stars midfielder Majid Ariff, Dollah Kassim and former national captain Seak Poh Leong, to name a few.

Today the football pitch is gone, having made way for HDB redevelopment that will provide residents with the opportunity of living close to an MRT station. Appropriately, the station is named after the park, which was much more than just a soccer field. The open area comprised rugby and soccer pitches, and tennis courts. It was also home to the Farrer Park Athletic Centre and the Farrer Park Swimming Pool. Collectively, these comprised what was arguably Singapore’s best-known sporting venue of its time.

It is replete with history too. In its early years, the park accommodated a horse-racing track. Adding to its historical allure, the site was also a designated transit point for aviators who flew to Australia during the 1920s.

With such a legacy, it was of little surprise that people and interest groups felt strongly about the intended transformation of Farrer Park. Mr Mason Tan, President of the Singapore Institute of Landscape Architects, was one of them. He wrote in the Forum page of *The Straits Times* that while everyone recognised the need for the North East Line, “change should not eradicate our memory of places, much less that of national historic or socially valuable places. Farrer Park is one such place. It is a people’s park.”

This was a classic example of a tussle between preserving what is familiar and sentimental and paving the way for development.

Above: Dilapidated houses giving way to the future.
Right: Detail of a hydrofraise cutter, used for diaphragm wall construction.











Above: Cutting into the earth face to install the first tunnel ring.
Preceding page: Installation of the first of seven layers of bracings to the cofferdam.

In the case of Farrer Park, the comprehensive development of the area could only be justified by the provision of an MRT station within the vicinity. This would benefit its residents and those working in the area. In addition, it would create the opportunity for commercial projects.

Now that the station has been completed, it is clear that Farrer Park has been given a new lease of life. It is remarkable to see new HDB flats towering in the space that once fielded football games. The completion of the HDB homes was timed to coincide with the opening of the North East Line. This meant that homeowners could move into their flats and have direct access and immediate use of the MRT station, which is underground and sited right under Race Course Road.

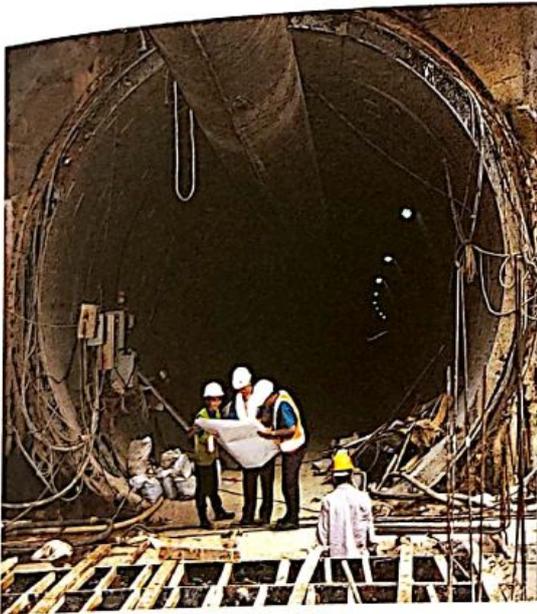
Aside from HDB flats, new commercial developments are being built in an area that previously was under-served by mega retail

complexes. An example is the up-coming Hong Leong City, which is expected to be property giant City Developments' largest project after Republic Plaza, its 66-storey flagship building at Raffles Place. The development will have an underground link to Farrer Park station.

Aside from developments near the station, structural provisions have been made to enable parts of the station to be integrated with future developments. For example, the area on top of the station box has been designated for development that could include a 20-floor residential-cum-commercial building.

Traffic Diversions

Because of its proximity to bustling Little India, the construction of the station required traffic to be diverted, and bus stops and traffic lights relocated.



“ A big concern of the Authority and the residents was the impact of the excavation and tunnelling works on the settlement of the ground and how that would impact the surrounding buildings. The tunnels to be built from Little India station to Farrer Park station pass under Race Course Road. On the eastern side of the road are buildings of varying vintage, with some being more than 100 years old.”

– Mr Ow Chun Nam, LTA Project Manager

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Traffic diversions and road closures were done in phases to minimise inconvenience to users. To prepare residents for the changes, LTA officials distributed brochures to residents, met grassroots leaders and assured them that the Authority would impose strict housekeeping rules on the contractors. There was also a hot-line number which residents could call for assistance.

Protecting the Buildings

As in other areas on the North East Line, it was a challenge to build a station and its connecting tunnels. LTA Project Manager Mr Ow Chun Nam explains: "A big concern of the Authority and the residents was the impact of the excavation and tunnelling works on the settlement of the ground and how that would impact the surrounding buildings. The tunnels to be built from Little India station to Farrer Park station pass under Race Course Road.

On the eastern side of the road are buildings of varying vintage, with some being more than 100 years old."

Most of these buildings are just two storeys high while a handful are four or five storeys high. With the exception of a few new buildings, most were built on 'strip footings' and supported by shallow *bakau* (timber) piles, a common form of building foundation before stronger concrete and steel piles became widespread.

Compounding this situation was the fact that the ground in the area was soft. This meant that some buildings could settle as a result of the tunnelling activities. To fully appreciate the situation, MRT engineers tried to acquire blueprints from the Building and Control Authority. However, because most of these buildings were built decades ago, their architectural plans and drawings were no longer available.

Above: Temporary decking for construction and vehicular traffic.
Right: Hoisting bin containing muck churned up from the bored tunnelling.





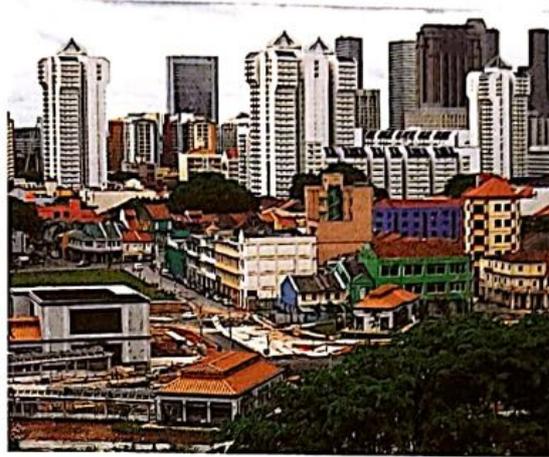
The engineers relied on their surveys and analysis of the soil profile in the area to identify buildings that could be affected by the construction activities nearby. As a precautionary measure, about 50 buildings were fitted with metal supports. Engineers also set up instruments to monitor any tilt in these and another 50 buildings along a 550-metre stretch adjacent to the tunnelling site.

Recalls Mr Kim Dong Tae, Project Manager of the Hyundai-Zublin Joint Venture, the contractor: "When I arrived in Singapore in 1997 to manage the project, my biggest worry was about the protection of buildings near the site and the utilities underground which might be affected by our construction activities. We were successful in limiting the effects of the works."

Relocation of Foochow Methodist Church

Located on Race Course Road, just a few doors away from the stretch of Indian restaurants, was Foochow Methodist Church. The church building, which was more than 75 years old, comprised three sections, each of which was built during a different period, perhaps not surprisingly, with a different type of foundation. It was also a mere 20 metres away from where excavation works for the tunnels would begin.

One section of the building had foundations made up of 'H-piles,' which were able to withstand the ground settlement resulting from the deep excavation work. But the other sections were built on 'strip footings' or on shallow *bakau* piles. Unfortunately, ground movement due to excavation work worsened cracks on the church walls because the different parts of the building did not settle uniformly.

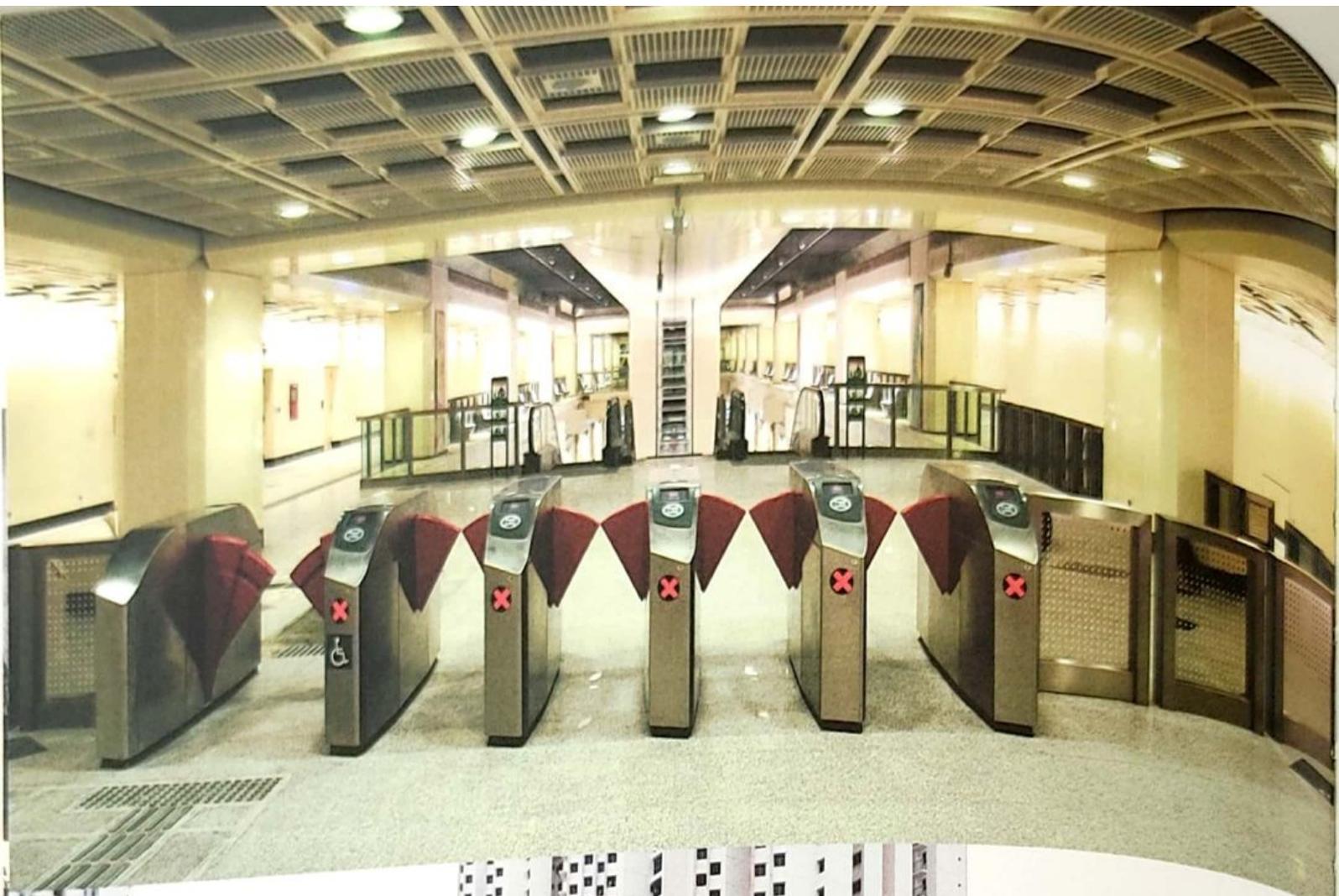


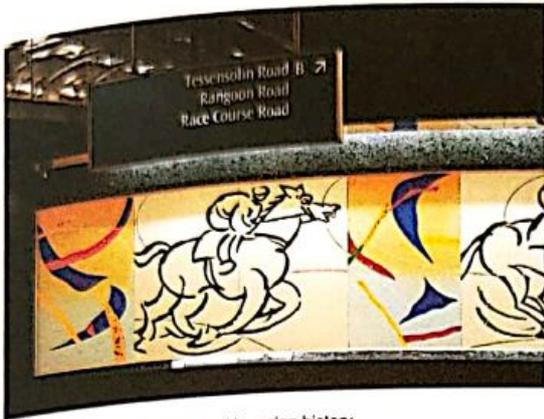
Above: Farrer Park station entrances at the final stage of construction. Left: Temporary works for Farrer Park station.

The church members were concerned. The LTA halted tunnelling work in the area to investigate, and found that the church's structural condition was unsafe and required strengthening before tunnelling works could resume. Dr Tan Cheng Bock, an LTA board member, visited the church elders to clarify the situation and explain the intricacies involved in the MRT works.

The LTA recommended that the church be temporarily relocated to the vacant Rex cinema about 500 metres away. The Authority and its contractor, Hyundai-Zublin Joint Venture, renovated the cinema, and set up containers in the compound for the church to carry out its Sunday school classes. By February 1999, the cinema was ready, and the LTA arranged for the 1,000-strong congregation to move to their 'new home'.

In the meantime, the LTA worked with the church's engineers to strengthen the building using steel supports and micropiles before excavation activities resumed some four months after they were halted. Quoted in *Journeys*, an LTA publication, Mr Wong Ha





An artistic tribute to Farrer Park's racing history.

Hee, Secretary of the Trustees of the Methodist Church in Singapore, said: "I'm beginning to understand the difficulties in building the MRT. In the last few months, I've learned about marine clay, how buildings behave, and the measures that the LTA had to take. The task is tremendous."

After construction activities were completed, engineers monitored the ground movement for about nine months. A structural consultant was also brought in to confirm that the church building was structurally sound. A year later, in January 2000, the congregation returned to their church premises.

Moving On

Despite the positive impact that the advent of the MRT line has had on Farrer Park, some residents had to contend with considerable changes and adjustments. Among them were those whose homes were near the sites of the Farrer Park station at Race Course Road, and homes along Owen and Serangoon Roads. These residents had to relocate and began moving out in 1997 after receiving compensation from the Government.

Contract 706, 701 & 711

Hyundai Engineering & Construction Co., Pte Ltd-Ed Zublin Ag Joint Venture

Hyundai Engineering & Construction Co. was among the top ranked domestic contractors when it was established in Korea in 1947. HDEC's unique combination of resources, equipment and experience was rewarded in August 2001, when Hyundai was ranked 14th among construction companies worldwide.

C706

Design and construction of Little India and Farrer Park stations; 1.6km twin bored tunnels; 500m cut-and-cover tunnels.

C701 & C711

C701

Design and construction of architectural, civil, structural, electrical and mechanical works for a new depot, and a new electrical substation to be located at the depot.

C711

Design and construction of HarbourFront station; 340 metres cut-and-cover tunnel from Gateway Avenue to Seah Im Road; widening and upgrading of Telok Blangah Road from Gateway Avenue to the World Trade Centre overhead pedestrian bridge.



 Boon Keng

MRT

 Shelter



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Boon Keng & Potong Pasir stations

Boon Keng station is located within a mature HDB estate whose origins date back to the 1960s. With the North East Line, residents of this estate, which is fringed by industrial factories, will soon see considerable change in their quality of life. This will be further improved with the Government's planned upgrading programme.





“I’ve lived in Boon Keng HDB estate for about 30 years. It has changed little over the years but the MRT and the upgrading programme will bring more business, more change to the area. Maybe more young people will live here too. Now, many of the residents are older folks.”

– Mr Chua Kim Pheng, 71, Chairman of Jalan Besar Bendemeer Residents’ Committee

Surrounded by blocks of HDB flats, Boon Keng station is a boon to the thousands of heartlanders living in the area. The station takes its name from Boon Keng Road which is incidentally named after a medical doctor, Dr Lim Boon Keng (1869-1957), whose public service earned him an Order of the British Empire honour. The new station will be an outstanding amenity within a mature HDB estate of just over 30 years old which is slated for upgrading under the HDB’s Main Upgrading Programme. The upgrading will equip the estate with new facilities such as a covered shopping mall between Blocks 25 and 27, leading to an entrance of the MRT station.

Located under Serangoon Road and stretching out under an open field next to the HDB estate, the new MRT station will improve the quality of public transport for Boon Keng residents. Currently, a drive to town may take 20 minutes and there are Electronic Road Pricing fees to contend with. With the MRT, it will take about 10 minutes.

Transport convenience aside, Mr Chua Kim Pheng, Chairman of Jalan Besar Bendemeer Residents’ Committee, anticipates that the MRT station will bring an uplifting influence to the area.

“I’ve lived in Boon Keng HDB estate for about 30 years. It has changed little through the years but the MRT and the upgrading programme will bring more business and change to the area. Now, many of the residents are older folks. Maybe more young people will live here too,” he says.

The residents who are more likely to appreciate the station are the ones who had to put up with inconveniences during the four-year construction period. Living in such close proximity to the site meant that some of them had to forego their car park spaces when excavation work began in 1997. A car park next to Block 22 and another one next to Block 34 – a total of 200 parking lots – had to be demolished as they were located at the station site. However, the LTA built new car parks with an equivalent number

Left: Lowering of the tunnel boring machine inaugurates the commencement of tunnelling works.

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Installation of temporary sheet-piling using the vibro hammer.

of lots near the affected blocks. Though residents now have a walking distance that is slightly longer than before, having an MRT station more than makes up for it.

Another inconvenience residents had to bear with was the noise from MRT works. Mr Chua points out that the LTA sent out flyers advising residents of various stages of the construction work. In particular, they were told of the choice of the methodology, and the continuous process for the

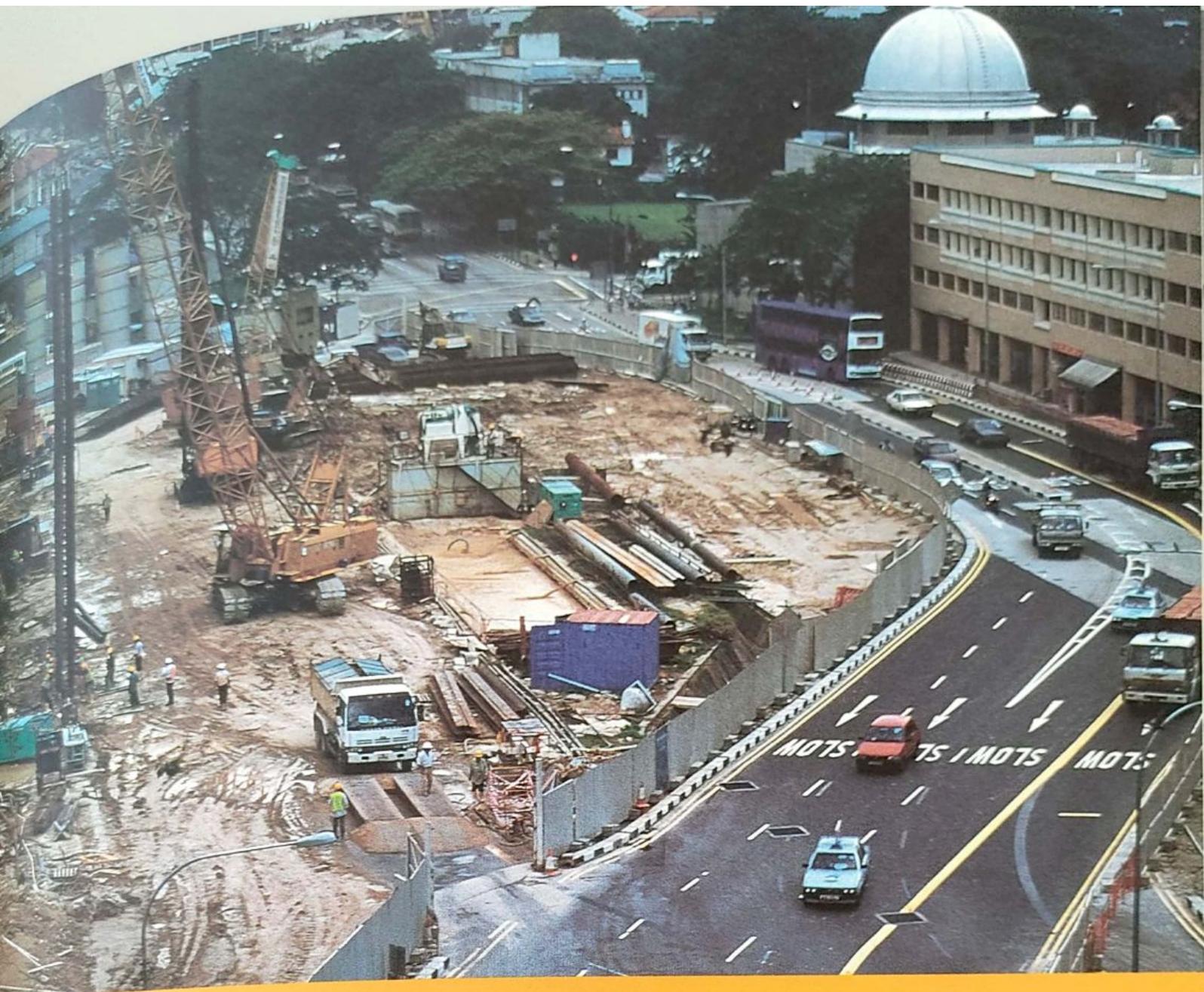
construction of the diaphragm wall which formed the perimeter wall of the station.

Some businesses, specifically a restaurant and a chicken rice outlet, were affected by the hoarding that was set up near their premises. Says Mr Chua: "The town council was understanding enough to allow these businesses to put up signs in various places nearby to direct customers to their shops." Now, with the MRT up and running, businesses can look forward to a rise in customer traffic.

The MRT works also affected traffic flow along Serangoon Road. As the western wall of the station was built under the road, several road diversions had to be implemented for the excavation of the site and the construction of the station. Despite the changes in the road alignment, the overall road capacity was for the most part maintained. This was achieved partly by the use of metal decking to keep sections of the road open while construction work went on underground.

Another challenge was posed by the presence of 230kV electrical supply cables that ran mostly at the edge of the station site and partly over a portion of it. "These underground cables which run next to Serangoon Road all the way from Potong Pasir supply electricity to about a third of Singapore," says Mr Ng Seng Yoong, Project Director for the contractor – the Kumagai-SembCorp-Mitsui Joint Venture, "so we had to protect them from damage and from vibration."

Also in need of protection were the cast-iron pipes that lay alongside the electrical cables. These pipes carried potable water and were relocated by the LTA from their original position which cut across the station site.



The presence of 230kV electrical supply cables that ran mostly at the edge of the station site and partly over a portion of it proved to be of concern during the construction phase.

“These underground cables which run next to Serangoon Road all the way from Potong Pasir supply electricity to about a third of Singapore,” notes Mr Ng Seng Yoong, Project Director for the contractor, the Kumagai-SembCorp-Mitsui Joint Venture. Commenting on the delicate situation, he adds:

“We had to protect them from damage and from vibration.”

BOON KENG &
POTONG PASIR
STATIONS

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Above and right: The steel framed entrance canopy at Boon Keng station.

Unconventional Solution

While the construction of Boon Keng and Potong Pasir stations involved numerous tried-and-tested engineering methods, the contractor, for several reasons, opted to use the 'semi top-down' method to build the station proper.

The top-down construction method allows the substructure and superstructure works to be carried out concurrently. Since there are no above ground superstructures for the MRT stations, the term 'semi top-down' is used. As its name suggests, the semi top-down method required the roof slab to be laid first. Excavation to the next level – the concourse – was then carried out from large square openings in the roof slab. Following this, the concourse slab was laid. This slab also supported large openings that facilitated the excavation of the lower platform level.

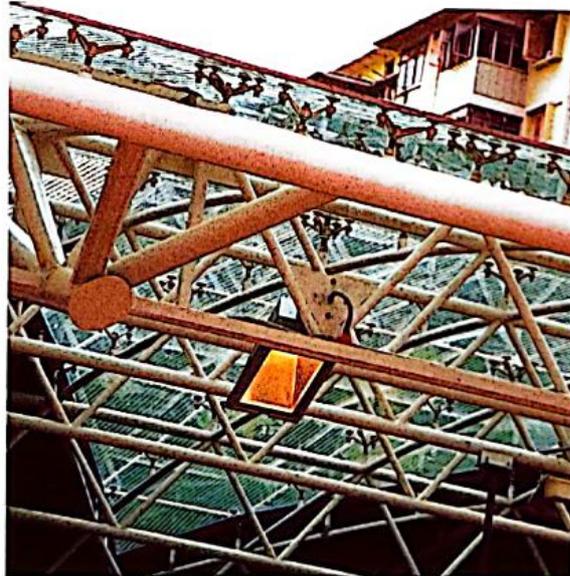
This is the reverse of the conventional 'bottom-up' method, whereby the station is excavated to the level of the station base. This is then followed by the construction of the various station structures from the base slab upward.

The semi top-down method had several advantages. Firstly, the roof and concourse slabs are used to strut the diaphragm walls during construction. This reduced ground movement and minimised disturbance to nearby buildings. This was particularly relevant in Boon Keng because excavation work was carried out within about eight metres of some HDB blocks. Secondly, construction costs were cut as the slabs replaced thousands of tonnes of steel strutting that would have been required to prop the diaphragm walls.

Other Construction Considerations

The tunnels linking Boon Keng station with Potong Pasir station to the north were bored under a row of prewar shophouses on Serangoon Road, near Bendemeer Secondary School. Most of these shops housed businesses dealing in vehicle sales and repair, while the remainder included a drapery retailer and an IT school.

During tunnelling, the contractor closely monitored the amount of ground settlement but found it to be within an acceptable range that had no impact on the structural integrity of the nearby buildings. To reduce ground settlement, the contractor decided to expedite its tunnelling works by working 24 hours a day, seven days a week, compared to the original six-day-week work schedule. As a result, the shophouses were unaffected.



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Above: The Boon Keng station ticket concourse.
Left: The platform area of Boon Keng station as seen from the concourse.

Beyond the shophouses, the tunnels crossed under Whampoa Canal and Kallang River. As requested by the Public Utilities Board (PUB), the contractor reconstructed a 50-metre long section of the 25-metre wide canal above the tunnels, upgrading it from an earth drain to a reinforced concrete canal. PUB then upgraded the rest of the canal. "It was safer for the tunnel underneath to be constructed first before the canal upgrading work," says Mr Ng. He notes that it was always safer to build the canal from bottom upwards. If done the other way around, one would risk damaging the canal and/or its waterproofing while tunnelling underneath.

Potong Pasir Station

Just a few kilometres from Boon Keng is Potong Pasir station, which is built at the edge of the Potong Pasir HDB estate and

sited under the stretch of Upper Serangoon Road which runs by the estate. Across the road is a sprawling private residential estate, whose residents living on roads such as Wan Tho Avenue and Siak Kew Avenue can now access the station within a few minutes. In the years ahead, many more people will come to appreciate the station when projected developments planned by the Urban Redevelopment Authority for this area take shape.

These developments will spur the growth in usage of the MRT station, which up to early 2002, had not been slated to open with the rest of the North East Line. The reason: the projected commuter volume did not make it viable for the station to be in operation. Originally, the plan was to build only the shell of the station and fit out the rest of the station at a later stage when there was an increase in the projected commuter usage. It was later determined that if the station box were left empty, it would cost more for the station to be fitted later.



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The Potong Pasir station interior.

construction site called him on his mobile phone to complain about the noise level. "My mother is sick and is sensitive to noise, so can you tell your workers to stop work or lower the noise," the resident asked. A concerned Mr Tay, who was at home in Yio Chu Kang, replied that he was concerned, adding: "I'm coming over to your place now."

The caller sounded relieved that he was being taken seriously and that something would probably be done to alleviate the situation. When Mr Tay reached the site, he asked an engineer from the work site to measure the noise level. Both agreed that it was high. And while both also realised the cause – the

construction of a diaphragm wall – they knew that the works had to be carried out continuously until completion. This was explained to the resident and his mother. A few days later, as a gesture of goodwill, the MRT contractor installed free of charge, an air-cooling unit in the resident's home.

Looking back on the case, Mr Tay says that he and his colleagues in the Corporate Communications Department hold the view that the best approach to managing complaints is to show empathy and do something to reduce the problem. "We don't view callers as a nuisance. If we were in their shoes, we might feel the same way as them," he says.

Contract 705

Kumagai Gumi-Sembawang Engineering-Mitsui Joint Venture

Kumagai-Sembawang-Mitsui Joint Venture (KSMJV) was formed and registered in Singapore as a partnership on July 3, 1997. It comprises of 3 partners – Kumagai Gumi Co., Ltd, SembCorp Engineers & Constructors Pte Ltd and Mitsui Co., Ltd.

Kumagai Gumi is one of Japan's leading general contractors, and a major international force in bored and immersed tube tunnel construction. Kumagai's enviable track record in shielded tunnelling includes major achievements such as the Trans Tokyo Bay Highway using a 14.4m diameter slurry shield, and the first use of the three-centred slurry shield method.

With its headquarters in Singapore, SembCorp Engineers and Constructors is a member of SembCorp Industries, Asia's foremost engineering services group. SembCorp Engineers and Constructors provides engineering and construction services in the building, infrastructure, petrochemical

and processing sectors in more than ten cities across the Asia-Pacific region.

Mitsui Co., Ltd (Mitsui & Co) is better known as an international 'business creator' offering value-added services to clients worldwide. The company's operating groups oversee a broad range of products, and include eMitsui, iron and steel, non-ferrous metals, general merchandise and property development, machinery, electronics and information business, chemicals, energy, foods, textiles, retail and transportation logistics.

C705

Design and construction of Boon Keng and Potong Pasir two-level Civil Defence underground stations; 1.8km of twin bored tunnels; 280 metres of cut-and-cover tunnels; reconstruction of the 60-metre Whampoa Canal and widening of Upper Serangoon Road.

