As a key deliverable of the Victorian Transport Plan, the South Morang Rail Extension Project was the first major rail extension to the metropolitan network since the city loop circa in 1980. Built on an old rail reserve, this multi-discipline project now provides the residents of Thomastown, Epping, South Morang and surrounding suburbs with improved and accessible public transport amenities and ultimately safer and more reliable train travel.

The South Morang Rail Extension Project included a combination of major upgrades and the construction of new rail related infrastructure. The project involved track duplications, new train stations, a major upgrade of an existing train maintenance facility, improvement works on pedestrian crossings, the construction of eight new bridges, the development of new car parking spaces and the upgrade of signalling systems.

UGL was contracted to the project to undertake the signalling and train control detail design, supply and installation of Computer Based Interlocking (CBI) equipment, off-site manufacture of location cases, testing and commissioning.

Project Delivery:
Commenced: October 2010
Completed: June 2012

Service offering:
• Project management
• Engineering
• Manufacture
• Construction
• Commission

Location:
South Morang and surrounding suburbs, Victoria

OVERVIEW
As a key deliverable of the Victorian Transport Plan, the South Morang Rail Extension Project was the first major rail extension to the metropolitan network since the city loop circa in 1980. Built on an old rail reserve, this multi-discipline project now provides the residents of Thomastown, Epping, South Morang and surrounding suburbs with improved and accessible public transport amenities and ultimately safer and more reliable train travel.

The South Morang Rail Extension Project included a combination of major upgrades and the construction of new rail related infrastructure. The project involved track duplications, new train stations, a major upgrade of an existing train maintenance facility, improvement works on pedestrian crossings, the construction of eight new bridges, the development of new car parking spaces and the upgrade of signalling systems.

UGL was contracted to the project to undertake the signalling and train control detail design, supply and installation of Computer Based Interlocking (CBI) equipment, off-site manufacture of location cases, testing and commissioning.

THE CHALLENGE
The Epping and Hurstbridge lines together carry around 60,000 of Melbourne’s rail passengers each day, with significant growth expected to continue. In the past two years, Melbourne has experienced an unprecedented growth in public transport patronage of almost 27%.

A rapidly expanding population increased CBD-based employment and rising petrol costs mean that more people than ever are using Melbourne’s trains.

The Department of Transport required an upgrade of existing rail infrastructure and signalling systems along the Morang line that would cater for the growing transport demands of Melbourne’s northern suburbs.

As part of the South Morang Extension Project, a signalling upgrade would need to be operationally safer, reliable, efficient, cost efficient and overcome the limitations of older technologies such as Geographic Relay Interlockings located along the Morang line. This is a technology that dates back to the 1960s which now is out dated in terms of interfacing with modern on board train and signalling systems which restricts networks from operating at their full potential.
THE SOLUTION

The project has achieved a first for signalling in Australia with the successful implementation of the next generation SmartLock SML400 Computer Based Interlocking (known as CBI). It is an advanced system that prevents or authorises trains to progress on any given route according to the condition of traffic on the network. It ensures a safe journey and avoids all risk of conflict between train paths which is essential for busy metropolitan rail networks such as the Melbourne network.

The SmartLock SML400 CBI is built on a SIL-4 platform widely used in safety critical applications throughout Europe. For European railways, the platform is able to integrate with vital signal telemetry networks and next generation object controllers. For UK and likeminded railways, SmartLock supports a fully compatible Solid State Interlocking (SSI) adaptation at both the data and the hardware level.

Another advantage with the implementation of this new advanced signalling system is that the signalling control centres, such as the one located at Epping at the heart of the rail extension, can take on incremental changes to modern systems already in place by adding an extra SIGMAP, or an extra SIGVIEW screen.

SIGMAP is an intelligent interface processor for signalling with protocol conversion fully developed by UGL in Australia. SIGVIEW is UGL’s train control product, built on the commercially available PCVue software platform. Like SIGMAP, the PCVue platform has developed over the years to keep pace with advancing technology and provides a stable “technology independent” platform as a base for the SIGVIEW product.

KEY OUTCOMES AND BENEFITS

UGL’s involvement in the South Morang Rail Extension Project has re-set the bar in the areas of next generation signalling technology implementation and collaborative delivery methods. The new signalling and train control system now successfully supports increased network capacity and improved system reliability.

This has allowed the introduction of extra services to meet the rapidly growing demand for public transport in Melbourne’s northern suburbs.

Key benefits and outcomes included:

- A system that ensures a safe journey and avoids all risk of conflict between train paths, which is essential for Melbourne’s busy metropolitan rail network.
- This overall collaborative approach adopted by the stakeholders and participants has resulted in the project’s successful completion well ahead of the scheduled date.
- SmartLock SML400 represented a cost effective and low technical risk solution for implementation which allowed maximum compatibility and re-use of the various legacy systems on the ground, enabling existing field equipment to be retained essentially unchanged.
- Next generation SmartLock SML400 CBI featured full backward compatibility with the existing SSI system as well as a modern architecture to support incremental technology upgrades into the future.
- An advanced Train Control System that features integrated timetable based train control and conflict resolution capability at junctions.