

# EASTLINK:

MELBOURNE'S  
MOTORWAY MASTERPIECE



PROJECT OVERVIEW : URBAN DESIGN : CONSTRUCTION : OPERATIONS

Published in association with World Highways magazine





No 1  
EastLink crosses  
another major highway  
at the Monash Interchange,  
the biggest junction  
on the new road

No 2  
The distinctive curved  
form of the EastLink  
Operations Centre  
at Ringwood



# CONTENTS

INTRODUCTORY WORDS FROM TIM PALLAS MP	03	Artworks	39
MELBOURNE'S MOTORWAY MASTERPIECE OPENS	05	BEHIND THE SCENES	46
EASTLINK: A WINNER ALL THE WAY	07	FAST-PACED AND TIGHTLY CONTROLLED	47
Fast Facts On EastLink	09	GORDON RALPH PROFILE	49
KEN MATHERS PROFILE	15	Artists' Impressions	50
The Initial Plans	16	VALLEY'S COMPLEX TUNNEL	51
JOHN GARDNER PROFILE	17	THE RAIL BRIDGE SLIDE	53
Local Community Welcomes EastLink	18	PRECAST YARD'S FLEXIBILITY	55
A ROUTE OF OPPORTUNITY	20	'PROVEN TECHNOLOGY' AT LAUNCH	58
The EastLink Trail	21	ROAD CONTROL AND OPERATIONS	59
EASTLINK OFFERS SOMETHING EXTRA	22	A MAJOR ABORIGINAL SITE	61
A ROAD OF DISTINCTION	25	LESSONS LEARNED FROM EASTLINK	63
MILLIONS OF PLANTS	31	Artworks	64
Environment, Flora, Fauna	35	AND TO SUM UP...	65
EXPLAINING EASTLINK	37		

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Managing Editor: John Clucas  
Sub-editor: Patrick Smith  
Technical Editor: Jason Barnes  
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# INTRODUCTORY WORDS FROM

VICTORIA'S MINISTER  
FOR ROADS AND PORTS

# TIM PALLAS

The early completion of EastLink, the largest road project in Australia during its construction, demonstrates the ability of the Victorian Government and industry to build successful partnerships and deliver successful projects.

EastLink is good news for Victoria, generating significant employment and business opportunities, including an estimated A\$15 billion boost to the local economy and 14,000 jobs during its construction and operation. It has also been good news for the construction industry which delivered the project five months ahead of schedule.

Of course, as this magazine highlights, EastLink is more than a road. It has been designed in keeping with Melbourne's focus on the built environment and its architecture

and public art demonstrates the importance of urban design in Victoria.

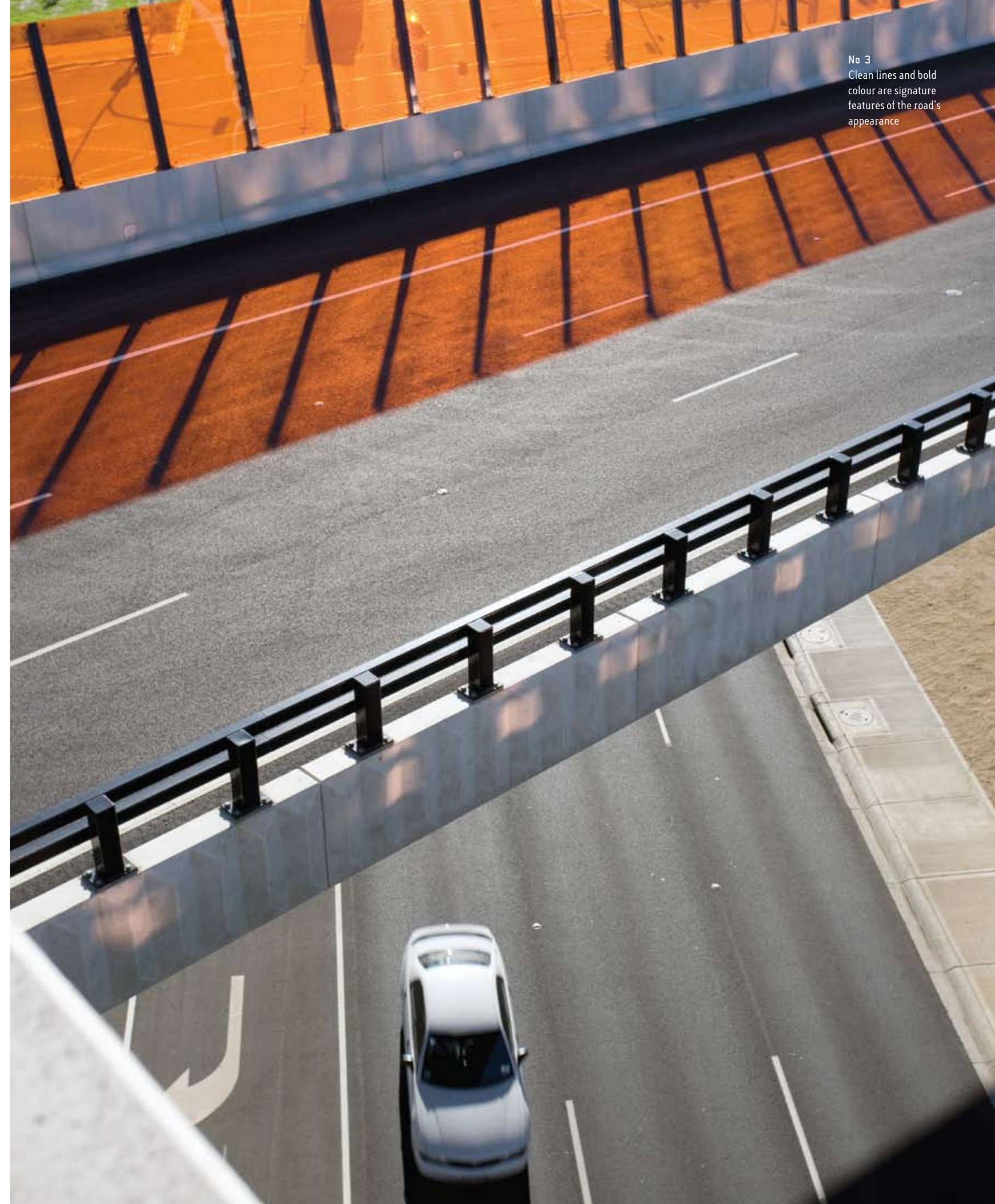
Likewise, emphasis on environmental initiatives and community engagement has been a key ingredient, with the preservation of the Mullum Mullum Valley and creation of significant wetlands and public parks a long-lasting testament to EastLink.

With EastLink now fully operational, the Victorian Government is looking ahead to meet the transportation needs of our community and economy. EastLink has shown what can be achieved when projects are planned in advance, and the Brumby Government is continuing this tradition by releasing its long-term transport plan. Infrastructure is central to our success and prosperity as a community and a long-term

transport plan enables the construction industry and the communities they work with to prepare for the challenges of the future.

I want to congratulate ConnectEast, its design and construction contractor Thiess John Holland and the government agency SEITA for delivering EastLink so far ahead of time. I also congratulate the local councils and communities along the project corridor for their involvement and cooperation in the EastLink project. EastLink is a landmark project for the State and its experience will help us to achieve even greater benefits for Victorian motorists and businesses in the future.

**Tim Pallas,**  
Victorian Minister for Roads  
and Ports



No 3  
Clean lines and bold  
colour are signature  
features of the road's  
appearance



# EASTLINK: MELBOURNE'S MOTORWAY MASTERPIECE OPENS

The 39km EastLink toll motorway was officially opened by Victorian Premier John Brumby on 28 June, 2008: on-budget and many months ahead of time.

"EastLink is the largest ever single addition to the Melbourne transport network and its early opening will provide time, fuel and vehicle efficiency savings for Victorians," Mr Brumby said.

It opened to the public the following day when ConnectEast, the owner and operator

of Australia's largest project, celebrated the successful and early completion of "the landmark Public Private Partnership (PPP) scheme" by making the first four weeks of operation toll-free.

The A\$2.5 billion EastLink route links Mitcham and Frankston in the city's east, and features 17 interchanges, 6km of toll-free bypasses, 88 bridges, a 35km shared use path and twin 1.6km three-lane tunnels.

ConnectEast's managing director, John Gardiner, said the opening of EastLink (and the untolled Ringwood Bypass) five months early demonstrates the capacity of the private sector to accelerate the delivery of massive projects.

He said ConnectEast is proud of the high quality finish and urban design of the motorway.

"EastLink means safer driving, plus time and fuel savings every day for many thousands of Victorians," he said.

The chairman of ConnectEast, Tony Shepherd, has been responsible for delivering many of Australia's landmark projects, including

Melbourne CityLink and the Sydney Harbour Tunnel. He rates EastLink as one of the most impressive motorways in the world. "I am immensely proud of EastLink and what has been achieved.

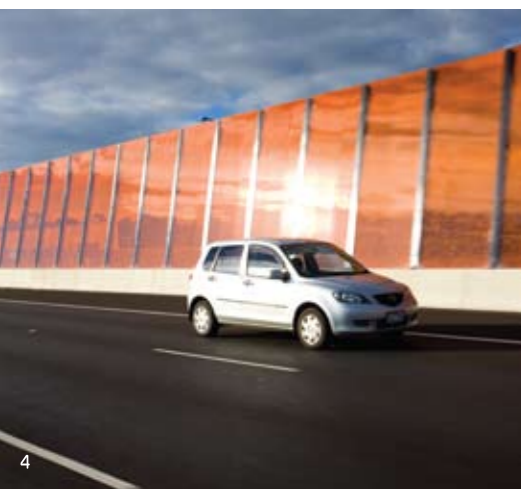
"This road is revolutionising the lives of people living and working in Melbourne's eastern and south-eastern suburbs by providing a high-quality uninterrupted north-south transport corridor from Mitcham to Frankston.

"With the cheapest car tolls of any private tollroad in Australia, motorists now have a new, affordable travel option: one that allows them to bypass congestion and many dozens of traffic lights on local roads.

"EastLink is already carrying a volume of traffic that makes it one of the busiest roads in Victoria, carrying higher average daily traffic than any tolled motorway in Sydney or Brisbane.

"Importantly, it is generating an economic boom in Melbourne's outer east and south-east, with businesses relocating to make the most of the motorway."

No 4, 5  
Transparent noise walls,  
part of EastLink's striking  
urban design





# EASTLINK: A WINNER ALL THE WAY

AUSTRALIA'S BIGGEST  
ROAD PROJECT  
TO DATE IS A WORK  
OF ART IN EVERY WAY

If there had been a road building event in the Beijing Olympics the new EastLink toll road project in Melbourne, Australia would have been pushing for a medal.

In every way the project, a 39km long urban motorway, has set new standards in design, construction speed, safety, environmental impact, and community enhancement.

At a construction cost of A\$2.5 billion, it is also the biggest project of its type completed to date in Australia. At around 13 cents a kilometre it has the lowest tolls for any private toll road in Australia, collected by a state-of-the-art electronic system that keeps the traffic free flowing at all times.

The road is environmentally sensitive and economically significant, reducing congestion on the eastern side of a rapidly growing city.

Melbourne is the second largest city in Australia with a population of 3.6 million.

Pride in the achievement runs across the board: in the State Government team that planned, commissioned and supervised the project strategically; in the Concessionaire that procured it and is now running it; among the operation and maintenance crews now settling into their roles for the coming years; and throughout the construction crews, designers and engineers that built it in record time.

"It is the kind of project you will take your family or friends to see, and then say 'I was a part of building that'," said one member of the construction contractor's team, Thiess John Holland (TJH).

But most of all, pride in the road is growing steadily in the communities alongside it, which after some initial concern have been largely won over, not just by the new amenity the road provides in ease, convenience and travel time saving, but by the way it has been implemented.

Enthusiastic commentary on the road is forthcoming from residents and users already, including spontaneous plaudits from the taxi drivers taking this report's author around.

Community anticipation for EastLink's opening was evident when around 150,000 people turned up for the road's celebratory open day.





# Fast Facts on EastLink

- Australia's largest urban road project when under construction
- Melbourne's second, fully electronic, free-flow toll road
- Lowest tolls for cars per kilometre for any private toll road in Australia
- Full interoperability with all other electronic Australian toll roads
- Connects the Eastern Freeway in Melbourne's outer east to the Frankston Freeway in the south-east
- It is 39km long with 17 interchanges, 88 bridges and another 6km of untolled connecting roads
- Twin, three-lane, 1.6km tunnels under the Mullum Mullum Valley
- A\$2.5 billion construction cost
- Three lanes in each direction for 33km, two lanes in each direction for 6km
- 7 million cubic metres of earthworks
- More than 1.1 million tonnes of asphalt
- 380,000 cubic metres of concrete
- Over 13,000 noise wall panels
- 1,000km of electrical cabling
- More than A\$50 million spent on landscaping with approximately 3.6 million native trees and shrubs planted
- 35km of new bicycle and walking tracks
- A\$20 million to enhance four rail stations in the EastLink corridor
- A\$5.5 million for public artwork: the largest commitment to art on an Australian road
- Around 60 wetlands to treat water run-off, improve local waterways and create habitat for wildlife
- Local creeks and waterways reinvigorated
- Estimated A\$15 billion boost to Victoria's gross state product
- Expected to create 6,500 ongoing jobs

## New Factories

Local industry has been especially pleased at time and cost savings realised on deliveries and distribution from the first weeks of its operation.

Numerous new factories and warehouses sprang up along the road's route during construction, a sign of its perceived value for the future, and more have followed.

Part of the positive reception is because the road has come with a range of enhancements.

As well as the main motorway, there are new bypasses for two of the major commercial hubs along the route, Ringwood and Dandenong, with major junctions into EastLink, both toll-free.

Four rail stations have been upgraded as part of an overall public transport commitment, and there is a new cycling and

pedestrian path, the EastLink Trail, for much of the motorway's length. The trail extends an important network of such shared use paths all around Melbourne.

Environmentally, the road preserves a highly significant bushland area, the Mullum Mullum Valley, by tunnelling beneath it.

Degraded waterways and creeks have been cleaned up, re-vegetated and restored. New parkland has been built for communities along the route and for the EastLink Trail.

There are even underpasses that can provide for native wildlife such as the duck-billed platypus.

But first of all EastLink is an exceptionally functional and good looking road, interesting, colourful and different. This is not because it crosses any spectacular natural terrain, just the opposite.

It is in a plain, mostly flat, urban context. As a result, it has been conceived and executed from the start with its appearance and aesthetic impact in mind.

Architectural design and land form shaping are used, not just to ameliorate hard engineering impacts but as an integral element of the structure, both in the concept and the detailed work during construction.

Millions of seedlings and shrubs, carefully selected to fit in with the local ecology, have been planted and nurtured along the route to soften the harder forms and complement colours as they grow to maturity.

Four specially commissioned huge art pieces, fitting the scale of a freeway, sit at points alongside the road to be observed from moving cars and trucks.

Another eight pieces, somewhat smaller, provide

interest and stimulation along the EastLink Trail, the three metre-wide bicycle and pedestrian path winding more or less along the same route as the motorway, but taking advantage of the wetlands, park space and the preserved bushland.

But even without these overt art pieces, the road uses its noise walls, retaining wall panels, cutting faces, bridges, tunnel portals and other structures to turn its full length into a constantly changing but harmonised roadscape of colours and tones that is not just pleasant but eye-catching, or as the EastLink architectural firm Wood Marsh puts it: "engaging and diverting."

It is intended to be "an experience, rather than just a routine car ride," says Roger Wood, the lead architect. It should be.

The road could almost be described as an artwork in itself. Certainly, when formulating the ideas for it, the architects had in mind the giant landscape sculptures of artists such as Robert Smithson, who makes pieces such as the Spiral Jetty [a 500 metre long earthworks in Idaho, USA, made from mud, salt crystals, basalt rocks, earth, and water], or others who wrap natural features in fabric on a grand scale.

Wood Marsh is not in any way pretentious, and the practice underlines emphatically that EastLink is still "just a road," with a very practical purpose to which the architecture is subservient.

But without flying into hyperbole, the outcome is still spectacular.

It is way beyond conventional provision. Melbourne already has a tradition of road design

that pays more attention than most to the installation of noise wall protection and use of design. Other freeways built in the city have contoured panels landscaped into the surroundings, and distinctive forms and shapes for major structures, not least the twin pillars of the Bolte Bridge over the Yarra River, the last major river bridge to be constructed in Melbourne.

## 'Another Level'

EastLink "takes things to another level" in the words of Ken Mathers, who directed the project for the Victorian Government, the ultimate client. It was deliberately so.

From the beginning it was built on the experiences of past road construction, including the Eastern Freeway and the successful CityLink toll road

in the centre of Melbourne, to achieve something new and different, setting an example that will draw attention from around the world.

Mathers' opposite number John Gardiner, managing director at Concessionaire ConnectEast, and the company that owns and operates the road, is in no doubt that it will be internationally significant.

From his own travelling and extensive road experience he thinks few countries in the world, or other states in Australia for that matter, do anything like as much to make their roads special.

Perhaps Austria and France pay attention to the appearance of bridges he says, referring to the approach roads to the Channel Tunnel (between England and France) and particularly the dramatic Millau Viaduct in

central France. But these are exceptional, and anyway "in most places you would get the slope at the side of the road left as it is, and the cuttings and retaining walls would be quite plain," says Gardiner.

That aesthetics and appearance have been at the forefront while attention is still paid to hard commercial realities is a more intangible but equally important outcome of the project.

Mathers argues that precisely because it is a PPP with access to commercial funding, it has been possible to add extras and features to the road that may otherwise have provided a "plain vanilla" outcome.

But things could also have gone another way. After all, the Concessionaire is there to make money, and providers are under constant pressure to minimise costs.



It is the achievement of the Victorian Government that it established Southern & Eastern Integrated Transport Authority (SEITA), a special government authority, with an experienced board and management team to initiate and guide through the EastLink project. It is also an achievement on the part of the Concessionaire that it was able to contain its costs and yet incorporate so many innovative features.

By emphasising the importance of quality design from the outset, running a vigorous competitive bid process to achieve the best possible offers and by keeping a firm grip on the promises and commitments made by the bidding parties pitching for the project (and indirectly beyond that by the contractor building it) an outstanding outcome resulted.

The Government, which will take ownership of the road, has not only succeeded in getting a transport facility that it would not otherwise have had (at least for some years yet) but has won a series of extras and additions.

Both parties pitching for the project during an intensive tender and bid process, offered other features to the road over and above the basic bid they were preparing.

“We insisted on the quality of the urban design alongside the technical qualifications for the tolling system, the quality of the engineering and the need for public amenity,” says Terrence Francis, chairman of SEITA. “The result has been new standards in safety, road quality, urban design, customer services and value for users.”

The end-product is special, different and innovative, but there are also the additional sections of road included as bicycle paths, parks and environmental clean-ups for wetlands and degraded urban creeks.

“There is an additional 6km of road for the scheme in two bypass roads for important local districts in the area. These are toll-free including a link on the main motorway itself,” says Gardiner. The bid included around A\$100 million additional spending for that.

#### Extra Environmental Work

Another A\$20 million went on the rail station refits and more than A\$5 million on the sculptures and artworks. There is a little more for extra environmental work.

Mathers emphasises that these “extras” come on top of the already high standard of design and environmental enhancement for the road, and despite a toll level which is less than any other privately owned motorway in Australia. They were drawn out by the flexibility and open-endedness of the bid procedure (see Bid, competition and oversight) which was descriptive, rather than prescriptive, setting the aims and ambitions of the Government at only the most strategic level.

“For example, tolls were not specified, nor the concession period - competition would drive the lowest tolls but we did require that increases be limited to the annual consumer price index,” says Mathers. It had to be free flowing electronic tolling as well as have interoperability with CityLink and other roads.

The aim was to draw as much innovation as possible from the bidders themselves and it seems to have worked, Mathers points out.

“We also insisted as part of the bid process that the contenders had to engage with the communities and local councils along the road and explore their wishes and needs in detail. That is

partly what drew out some of the extras.”

His general manager for engineering on the project, Geoff Rayner, also makes the point.

“Urban design quality was embedded in the selection process for the concession. It is something we learned from the experiences on CityLink before it,” he says.

“It was crucial that there be input from the architectural side right from the beginning and throughout with a role in signing off the design packages. It was not up for argument.”

All this is the more surprising in the light of the extremely fast delivery of EastLink. An already tight programme of four years was cut by five months by the contractor, joint venture Thiess John Holland, under a design and construction contract pushed through on a very aggressive schedule.

The speed and size of the programme would have been impressive anywhere in the world and for Australia it was record-breaking.

TJH project director Gordon Ralph proudly points to the fact





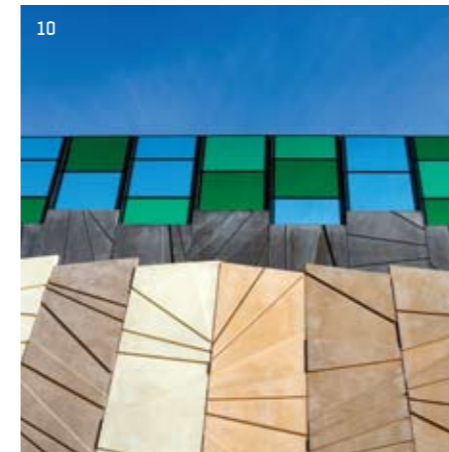


EASTLINK OVERVIEW

No 8  
Pleated balustrade panels and perforated metal cladding give a clean line to overbridges built with top down columns

No 9  
Cuttings on the tunnel approach are deliberately left to reveal the colours of the ground - part of the overall design philosophy

No's 10, 11, 12  
Greens reflecting the countryside, browns from the earth and bold contrasting black and white for structures are all part of the architect's "colour palette"



that on six occasions, the contractor was carrying out more than A\$100 million of production per month, unprecedented in the country, and deemed by many to be unachievable.

Not only was it done to the benefit of the client and the users now driving on it, but it was done well, safely and with full attention to the environment. The quality is everything the Government wanted.

Least tangible of all the project achievements, but equally as important, is the turnaround in community opinion. Initially there was some concern about the project being delivered as a tolled road under a PPP arrangement. But for Mathers there was no choice. "The PPP delivery enabled EastLink to be completed much earlier and with greater community benefit than could otherwise

have been achieved". By incorporating lessons from past construction projects, refining the specification process to allow flexibility and creativity, while keeping a grip on the project, including constant open interaction with all the parties involved, the process could deliver something special.

Mathers' view is borne out. The attitudes of the public, and especially the major user base of EastLink on the eastern side of the city, steadily changed as construction work proceeded, both as measured formally by surveys and as reflected in the media and other expressions of public views.

The road is now not only accepted but welcomed. The public, aided by a major communications effort by the community relations teams in SEITA, ConnectEast and TJH, have decided they like what has been delivered. That result

is more than 39km of urban motorway, filling in a critical gap in the network for the growing and wide flung Melbourne metropolis.

It is now also a feature of the landscape and part of the fabric of the area with its own distinctive landmarks, character and impact on daily life, of which it will increasingly become a part of.

"The design and amenity of this road is sensational stuff," said Mathers, a few months before the traffic started running. "I think no other road will compare with this and that the public will be absolutely delighted." It looks as if he is right.





# KEN MATHERS: A PROFILE

Ken Mathers is a civil engineer and chief executive officer of Southern and Eastern Integrated Transport Authority (SEITA). He has devoted most of his career to Victorian Government roads agencies, having several significant projects under his belt including rural highways and major freeways in Melbourne.

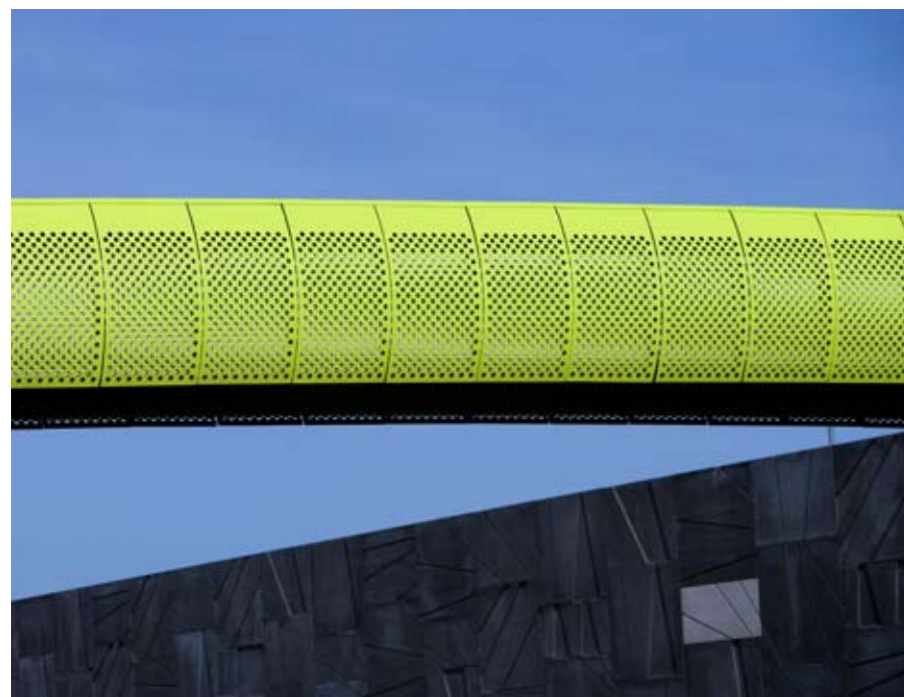
After delivering the first stage of Melbourne's Western Ring Road, he joined the project planning team for the Western and Southern

Bypasses in 1992. The projects eventually became CityLink, Melbourne's first major toll road and one of the State's most complex pieces of civil engineering. Major tunnelling and construction was carried out through a busy city and a highly complex tolling system was developed and installed.

When the State Government created a special purpose organisation to oversee the CityLink project in 1995 he joined it as director of

engineering and operations. He looked after development of documentation and bid assessment, and then moved on to overseeing design and construction: altogether five years of intensive involvement.

On completion of CityLink he worked as a consultant for several years before his appointment to SEITA in early 2003.



## The initial plans

Congestion on the major north-south roads in Melbourne's outer eastern area, and the need for major works to alleviate the problem were already apparent in the late 1980s, when the eastern areas began growing fast, says SEITA's Bruno Aleksic, the engineering and operations manager for the Scoresby section of EastLink (the section south of the tunnels).

Aleksic, previously with the State Government's road agency VicRoads, was involved in a government study in the late 1990s which concluded that there was a demand for a north-south highway to the east of the city.

This highway became known as the Scoresby Freeway before it was renamed the Mitcham Frankston Freeway, evolving into EastLink.

At the same time, plans were in train to extend the existing Eastern Freeway as far as Ringwood and Mitcham to meet the proposed Scoresby Freeway. The Eastern Freeway extension passed through one of the few remaining areas of undisturbed natural bushland in eastern Melbourne, the Mullum Mullum Valley.

Les Bull, SEITA's director of engineering on the northern half of EastLink, was at VicRoads at the time and recalls the controversy the plans

aroused, saying: "It was a very sensitive area."

The Government decided on a tunnel option but this proved far too expensive when put out to tender.

Ken Mathers, SEITA chief executive officer, takes up the story.

"In 2002 the Government decided to combine the Eastern Freeway Extension and Scoresby Freeway projects.

The project was subsequently named EastLink, and a special body known as SEITA (the Southern & Eastern Integrated Transport Authority) was appointed to oversee the delivery of the 39km motorway."



No 13  
Over 60 wetland spaces have been created or improved along the route providing community and ecological facilities



# JOHN GARDINER: A PROFILE



John Gardiner is managing director of EastLink Concessionaire, ConnectEast. He has had a varied background in consultancy, construction and management that has given him the experience and knowledge to gain his present position.

Born in New South Wales and still living close to Sydney with his wife and family, he commutes to Melbourne for the task, firstly seeing through the construction of the road and now the operation of EastLink.

He was born into a construction orientated family: his father and two brothers are all building contractors. They persuaded him

to study engineering, he says, heading him off from an early aspiration to be an architect because, he jokes, "that was too much like hard work".

A degree at Newcastle (then part of New South Wales University) was followed by an early venture into business with his brother setting up a precast concrete factory near Maitland in NSW.

To gain further experience, and perhaps to see the world, he spent three years in the UK working at precaster Downmac: "a pretty amazing experience", then moving into London in design roles. He even enjoyed

the English beer, he says. But the sunshine and warmth of Australia called him back in 1969, and after building design experience in various consultancies, he established his own consulting practice. That organisation became Gardiner Willis & Associates and grew to provide a broad range of services in engineering design, project and construction management.

The consultant had been the first in Australia to qualify under ISO 900 quality assurance (QA), and found it was able to advise others on how to tackle QA. A small unit built up, which in 1994 became a stand-alone consultant as Gardiner TQM, specialising in management systems and later in risk management and business management for clients like Southern Sydney Area Health Service, the Australian Army and Ausaid with offices in Sydney and also Jakarta.

"Luckily I got out just before the currency collapsed in 1997," he says. He was recruited, in fact, to operate and upgrade a toll road in Sydney, the M5 South West, owned by Interlink Roads.

It was a total change, he says, but suited him well. He made known his interest in EastLink in 2004 and after a "fairly long" recruitment process became chief executive officer in March 2005 as construction was already getting underway. A year later he became a director.



## Local community welcomes EastLink

**Motorists are the major beneficiaries of EastLink's construction, but Melbourne's cyclists and property owners are realising the benefits too**

After travelling widely and living in cities all around the world, 33-year old Matt Shakespeare and his partner Ingrid Andrich decided in 2005 to settle down and live in Melbourne. They had become enamoured with the bustle of life in London and sought a similar lifestyle in Melbourne.

It took them little time to realise that the sort of home they

wanted, located in the inner suburbs, just wasn't financially viable as their first home.

Matt takes up the story. "This was just as construction was starting on EastLink. When we saw what was proposed, we realised it would be quite feasible to live much further out, near EastLink, to buy the sort of home we really wanted and have quick access to the city and to the lifestyle that accompanies it."

Matt and Ingrid also realised that property prices further out would be enhanced by EastLink, so their decision was made.

"As it's turned out, our decision has been vindicated. We might be 25km out of the city, but we can get in there in no time," says Matt.

Matt and Ingrid are now seeing a number of other benefits of EastLink.

"The volume of traffic, particularly the trucks, in our neighbourhood has declined substantially: the value of the property we bought has skyrocketed and we've got a great new cycle trail."

Matt now cycles to work three or four days each week and is a key member of the local Ride2School network which encourages students to cycle to and from school.



No 14  
The pedestrian and bicycle trail along the route has many additional bridges and structures of its own





No 15  
Five pedestrian bridges each have their own colour and provide local landmark features on the road

No 16  
Asphalting was a highly coordinated largescale logistics exercise in its own right during construction



DESCRIPTION AND FUNCTION OF THE ROAD

# A ROUTE OF OPPORTUNITIES

THE NEW HIGHWAY IS PROVING A POPULAR PLACE TO SET UP BUSINESS

EastLink bisects some industrial areas, crossing wide regions still primarily devoted to agriculture, and passes through areas of natural bushland interspersed with parklands, small streams and creeks.

It intersects with growth corridors radiating out from Melbourne's Central Business District (CBD) to the east.

Constructing north to south connections between the radiating corridors has been difficult, and this is one reason why EastLink is so important, and will become much more so. There are north-south roads, including Stud Road and Springvale Road either side of EastLink, the latter alone carrying 66,000 vehicles per day (prior to the construction of EastLink). But both roads were becoming increasingly heavily congested and like all city roads, punctuated by frequent junctions and traffic lights.

Throughout its route, EastLink passes through some of the busiest and fastest growing areas of the city.

Frankston, a recreational seaside development, is located at the southern end with a dual two-lane configuration reflecting lesser demand than further on where it widens to dual three-lane highway.

Moving north, EastLink interchanges with the Monash Freeway, which carries up to 150,000 vehicles a day into Melbourne, while much of the last section of road at the Mullum Mullum Valley is in a 1.6km long twin tunnel, leaving the wilderness of the valley above untouched.

According to a recent report produced for ConnectEast by KPMG, much of the city's new development takes place in the mid-range suburbs, and these areas have grown to the west and east of the city.

Demand is likely to increase because Australia's population is increasing, and has been doing so in recent years as the country has opened up again to immigration from around the world.

"Melbourne is growing at record rates. Data released in March 2008 by the Australian Bureau of Statistics confirms that the city added 62,000 residents to its population base in the 12 months to June 2007," documents the KPMG report.

Only on a few previous occasions has the city grown at this rate, and its growth is faster than that of the more populous city of Sydney although perhaps not faster than in the south-east corner of the state of Queensland.



Such general growth along the new corridor will be enhanced by the opportunities the new road opens up. By significantly cutting journey times in the north to south direction, the road will have a major impact on jobs and industrial output along the corridor.

Companies in the Dandenong area report that their catchment for attracting employees has almost doubled and the reverse holds true for residents who can now look further afield for opportunities.





## The EastLink Trail

Cometh the road, cometh the path. A pedestrian/cyclist route follows EastLink

Winding along much of the roads length is a so-called shared use path, a late addition to the project bid, and an important extra facility.

The three metre-wide concrete pathway caters for pedestrians and cyclists, giving an additional recreational and transport link in EastLink.

The path fits into the landscaping and noise wall environment of the road, dipping behind noise panels where it can, or riding up over batters and embankments, and then down into newly created parks and around wetlands and ponds alongside the main highway.

A number of specially designed coloured bridges form part of the path line.

For Neil Hordern, the landscape coordinator with contractor TJH, the path is a fine recreational and leisure facility, providing a useful counterpoint to the nearby road, for fitness and health, and natural environment. Increasingly, city workers are using the bicycle for commuting.

The path is safe and surprisingly quiet for the users in many parts, and it will give them access to the 'green corridor' the road landscaping has created.

Victoria has been at the forefront of Australia's "quiet revolution" trend towards safe and pleasant cycling routes. Other popular trails in Melbourne include the Main Yarra Trail, Capital City Trail, Merri Creek

Trail, Koonung Creek Trail and the Bay Trail.

"Melbourne is a brilliant city for this," says Hordern, because it is relatively flat and well laid out.

The finest point of the path is the journey through the Mullum Mullum Valley, allowing walkers, runners and cyclists to enjoy the natural bushland environment and the creek running through it.

Extensive consultation was carried out with local residents on just how it should be routed, and a selection on the route made from three possible options. Jenny Carbery, senior project engineer with SEITA took residents around the valley to point out where the path would be constructed.

The final choice, steering clear of the creek itself, is an "engineered" path that uses natural timber bridges and timber boardwalk flooring in places rather than concrete, and doing its best to harmonise with the surroundings, while offering a broad clean route through the valley.

"The line was modified to avoid having to do too much cutting or formation of steep slopes," says Carbery.

For the really keen the EastLink Trail and the connections it makes now provide the chance to cycle virtually around the whole metropolis, an unusual outcome from a road project.

# EASTLINK OFFERS SOMETHING EXTRA

CONSIDERABLE TIME WAS SPENT DEVISING PERFORMANCE SPECIFICATIONS SHOWING WHAT WAS NEEDED. THE SPECIFICATIONS DID NOT SAY HOW IT SHOULD BE ACHIEVED

Ask SEITA chief executive Ken Mathers what has given EastLink its edge and he will tell you it is competition, drawing the best out of the private sector to add extra amenities and higher standards to what would otherwise be a fairly plain motorway.

Considerable time was spent devising performance specifications that would make it clear what was needed without saying how it should be achieved.

Les Bull, who worked on these specifications, says the document was a fraction of the size of a normal specification, yet clearly spelt out the state's requirements.

What it did was to set targets such as a 100-year life for the structures. For example, the road had to fall within a certain route envelope but the exact alignment was variable; the shape of the interchanges was open to variation, and the pavement had to perform to a certain standard yet its make-up was not prescribed.

Urban design had to be part of the mix and the bids had to show that they reflected the community expectations along the route.

The specifications for operations were equally open ended. The tolling system had to be fully electronic and it had to be interoperable with other electronic toll roads in Australia, but toll levels and products were not specified. Even the concession period was variable, being open for offer according to the discretion

of the bidder. The Concessionaire had to bear the risks of future development: no deals were open for guaranteeing traffic levels by limiting the Government's other options. If the State decides to build a new railway alongside it, or even a new highway, the Concessionaire has no basis to complain.

These requirements were partly influenced from past experience in Australia, including CityLink.

### Competition Was Vital

Another lesson from that decision was to continue the bidding competition right through to the end until the project was awarded.

But keeping competition going would have been pointless if there was only one contender.

Transurban (already running CityLink) was an obvious contender. And then TJH (Thiess John Holland) and investment bank Macquarie Bank put themselves forward as ConnectEast. The bidding that followed was one of the most extensive ever seen for both teams with each having more than 1,000 staff and consultants. Both were kept entirely separate by the Government.

Formulating the bids took a year of submissions and revisions, as SEITA looked through proposals and came back with questions

and queries on a large range of issues. The process finished in October 2004 when the award was made.

"Both sides were told to have their senior people ready on a certain morning and were driven to a location. One side was shown into a room and were told that they had won. The other left empty-handed, as is the case in these very large transactions," says Mathers.

But that was not the end of it. Translating the offers into an excellent actual product was still to come. That was the responsibility of the new Concessionaire ConnectEast, which quickly moved to let a design and construct contract to TJH.

To monitor that, however, SEITA specified a tight framework of check-offs and oversight.

Like most modern contracts, both design and construction were self-monitored by Quality Assurance (QA) procedures and checks as work progressed. But SEITA required these to be subject to oversight and auditing by a variety of checking consultants and overseers.

At the top of the tree was the Independent Reviewer (IR), a small team of consultants led by Sinclair Knight Merz (SKM) with Maunsell and Davis Langdon. Its job was to satisfy itself that the various detailed checks and monitoring processes were carried out correctly.



The IR did not specifically check and control work itself (though it would make regular visits to the site) but had to be responsible for stating that the work met the required standards and that the hierarchy of procedures beneath was working.

This is different to the role of a traditional engineer, explains Peter Balfe, the consultant who led the team and, like many involved in the project, a former VicRoads employee.

“It is not a checking of minutia but a general oversight,” he says.

The importance of the IR is that it ultimately signs off the project, and without its certification tolling could not commence.

“It is a powerful sanction,” declares Ken Mathers at SEITA, and a part of a completely independent oversight for the project and its standards.

The IR is employed jointly by the Government and Concessionaire ConnectEast, and reports jointly to the two, ensuring impartiality between the two client sides in the equation. No input comes from the contractor, which further ensures objectivity, says Balfe.

It is an important consideration. Elsewhere in Australia a similar role has been played by the Independent Verifier (IV) but this role is somewhat different since the IV certifying body is employed jointly by the Concessionaire and the contractor, changing the balance of the relationships.

Beneath the IR was a structure of both design and construction checks.

In the design process the engineering consultants working for the contractor (Parsons Brinkerhoff Hyder Joint Venture and CWDC) had to have their designs independently checked.

Balfe says: “Notionally this is done by another consultant but both the main design firms used other offices from their own firms to do the checking.” This was allowable providing there was a ‘Chinese Wall’ between the two offices of the consultant.

Designs then passed to another consultant, the Proof Engineer & Construction Verifier (PECV), which on EastLink was a SMEC/KBR joint venture. This body checked the compliance and fitness of the designs to the requirements of the concession deed.

“From there the designs passed to various review parties as appropriate,” says Graham Gilpin, ConnectEast general manager construction and also an ex-VicRoads employee. These included his small team and SEITA. Each could add comments or object to elements if they felt the designs did not match specified requirements.

One important element in this process, says Gilpin, was that the designs were also passed through to the future operations and maintenance contractor, Transfield Services, which could highlight issues that might affect the operations.

Paying attention to such detail is rarely done in road design and construction contracts but it can mean big savings and safety improvements for future operations. The tweaks needed in the design could often be done without any additional cost or effort on the construction, says Gilpin.

This cycle was repeated between the initial design outlines and the final design, with the opportunity to mark up comments at both stages.

#### Working Arrangement

Although there was a danger that the process could become excessive it did settle down into a working arrangement which Gilpin considered was important and useful. The various parties involved had tight limits set for making their comments so that the contractor was not unduly held up waiting for responses.

According to SEITA’s Les Bull, making this work was a matter of judgement and establishing good relationships and flexibility, a process helped because many of those working on the project (for the contractor as much

as for the two client bodies) had been former colleagues at the Government agency VicRoads. There was a common understanding of how to work together, he says.

Rob Devlin, the contractor’s design manager, says that an electronic document tracking system helped enormously too. TJH used a system called InCite, which was developed in Germany and is now available through Leighton Holdings. Despite early glitches it proved invaluable in handling hundreds of design packages through up to four cycles of commentary and approval, says Devlin.

The PECV was employed by the contractor and the Concessionaire, and was in turn monitored and checked by the IR, which audited its systems and did spot checks.

Construction itself was subject to a QA process by the contractor, which was responsible for auditing and guaranteeing its own systems according to normal QA practice. Site work was also monitored and checked by the PECV.

“The IR had a responsibility for general overview and reasonable checking of all aspects of the contractor’s work and also for auditing the performance of the PECV,” says Gilpin. “So the IR did audits on the contractor’s system from time to time, and it also did audits of the PECV to see that it was undertaking its proper role.”

According to Balfe, the IR also made its own site visits to ensure the contractor was meeting requirements. A key example was the soil nailing system. There were some discussions about the long term durability of the steel anchors grouted into the ground. The IR insisted on a demonstration that the grout injection method for the nails would properly surround each in the ground to protect them. Installed nails were dug up and examined to ensure the process was good.

The result of this cycle of checks and balances is the road itself, and the achievement of high standards throughout.



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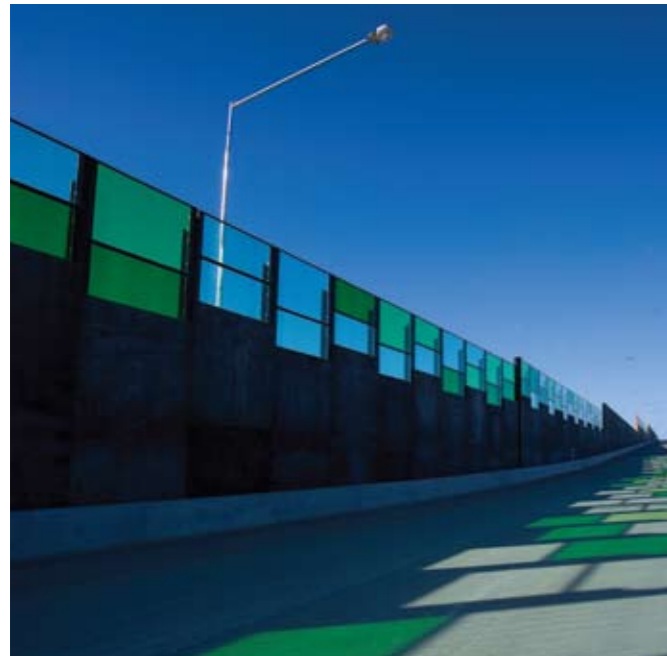
No 18  
EastLink construction included a major tunnel project underneath the Mullum Mullum Valley

No 19  
The construction effort needed for the project was the largest in Australia



URBAN DESIGN AND APPEARANCE  
WEIGHED HEAVY IN THE EASTLINK  
SCALES ALONGSIDE TOLL LEVELS,  
TECHNOLOGY AND CIVIL ENGINEERING.  
BIDDERS WERE LEFT  
IN NO DOUBT ABOUT THIS

# A ROAD OF DISTINCTION



Few roads anywhere have taken the concept of urban design to the level seen on EastLink. From the beginning there was an insistence by client SEITA that it wanted to see a major emphasis on urban design quality.

The outcome is a coherent, unusual and striking appearance for the road. For its entire length, the tunnels, bridges, cuttings, retaining walls, noise protection barriers and even the signal and toll gantries, have an integrated and consistent feel and appearance: harmonised all the way, and with the surroundings at any particular point.

However, EastLink does not lack variety or interest: far from it. There is a constantly changing roadscape of different colours, shapes and perspectives, formed by a range of colours and shapes for barriers and concrete retaining wall facings, and sometimes by deliberately left natural cuttings walls or painted cuttings to simulate the same.

In places, transparent panelling in shades of green or orange give perspectives onto roadside views of bushland or wetland ponds or the panelling itself merges into them. Landscaping of noise-deflecting mounds and slopes

along the road is integrated with the noise wall provision, and both work with plantings and vegetation to merge the various design features, an aspect that will become more obvious as time passes and plants grow.

In other places, sudden startling bursts of bright colour stand out. Sometimes these are the noise wall panelling, and particularly a fairly strong orange colour for some of the transparent acrylic panels. There are five deliberately bold footbridges in five different bright pastel colours, although each is the same shape with a tall extended signature pier on one side. These are intended as landmark points to be noticed and referenced: perhaps by giving directions to people or punctuating a journey.

## Biggest And Boldest

The biggest and boldest shape of all is the EastLink Operations and Control Centre (ELOC), a startling curved two-level, serrated-edge flat-roof building in a light and dark green chequered pattern, which projects out over the motorway it controls on top of high coloured retaining walls. It has impact. But it also holds together in a way never seen on a road before.

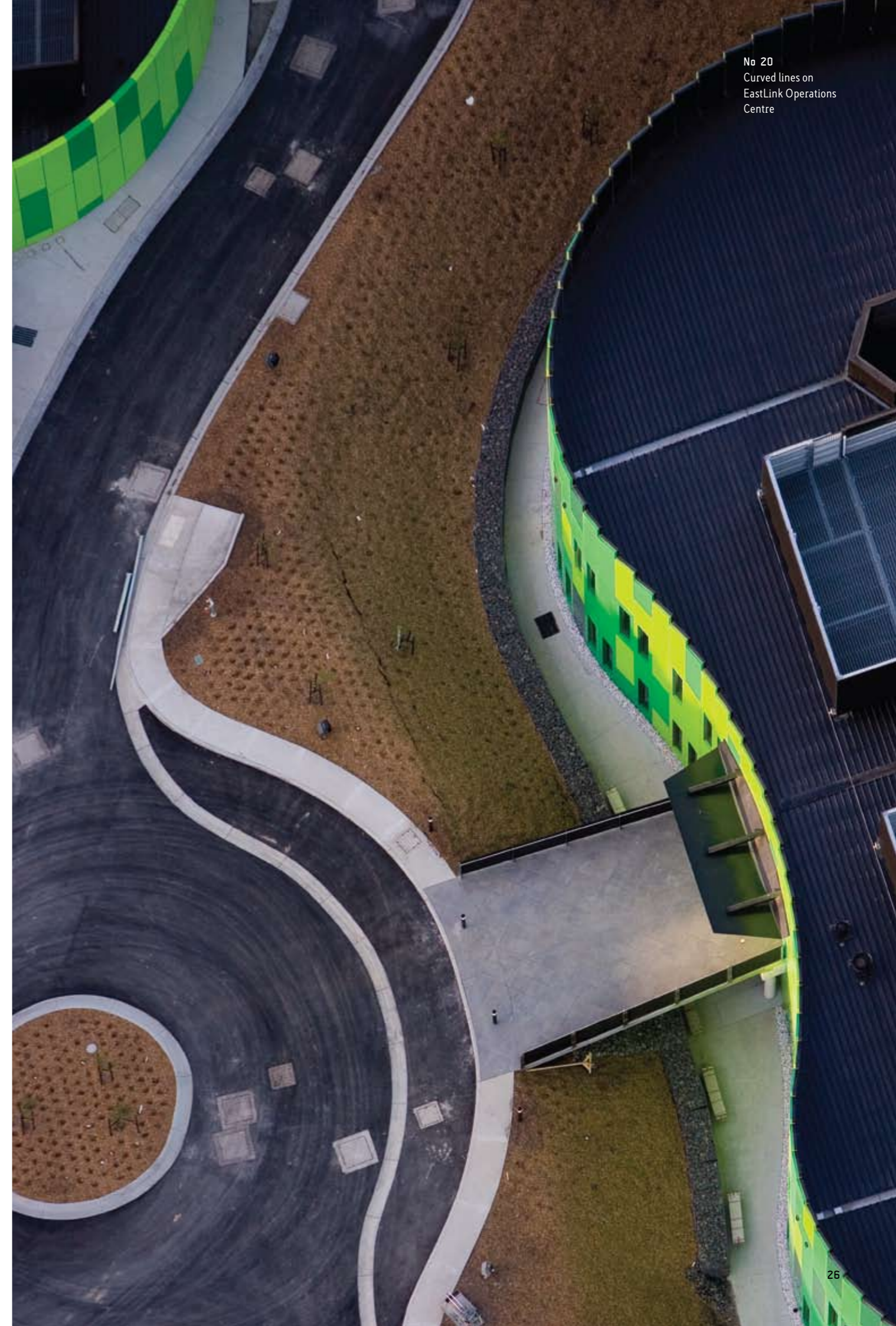
Behind this stand-out design for the road is the architectural partnership of Wood Marsh, which has a reputation for strong and unusual designs over a 25-year period, primarily in Victoria, although it has an international profile.

It had already worked on large-scale urban designs for noise walls on the city's award winning Eastern Freeway, and the two partners, Roger Wood and Randal Marsh, were obvious contenders for EastLink.

Together with landscape consultant Tract Consultants, also involved on the Eastern Freeway, they have been closely involved with the design and its implementation for EastLink, starting with the initial concept for the appearance of the road.

"We wanted a geographical character to be quite specific for EastLink, of the highest order in design sense, and something that made the road an experience rather than an engineering result. It is a journey worth having," says Roger Wood.

As a design challenge, the road is exceptionally large scale: big enough to be seen from the air.







**No 21**  
Facing panels for reinforced earth cuttings were designed to echo the colours of the ground

**No 22**  
A special charcoal colour was used in many of the noise wall panels, which were among thousands of precast elements produced for the road at a dedicated factory



**URBAN DESIGN**

The well-known land sculptures such as those of Robert Smithson or Kristo have appeal at this scale and it was worth translating those kinds of ideas into the road design.

“That is not to say the road is an artwork, but it should incorporate the design feel in its structure and avoid the idea of ‘decorating’ structures and surfaces. At this scale what you need is a relatively simple suite of elements,” says Wood.

A “consistent palette of colours” is deliberately contained with white, black and a dark charcoal grey colour featuring strongly. One of several noise wall types, for example, uses textured square panels in charcoal concrete arranged in a random pattern. Other panels are off-white, overlapping curves with a rock texture.

But there are also brighter colours, drawn from the environment of the road and its bushland, with three shades of green for transparent panels and an orange which is found on the bark of some eucalyptus species.

Green also features inside the tunnels for the vertical panelling alongside the road, again a relatively unusual feature. Multiple colours appear on the ventilation stacks where there is decoration, using plant and environmental motifs. Other colours match the geology of the rocks.

Retaining walls are used frequently along the route (particularly where there is a cutting with extensive soil

nailing) to strengthen the ground, which is faced with vertical panels of concrete.

Three shades of brown and reddish brown reflect the colours of the sandstones and siltstones of the ground and the faces of the cuttings made through them.

“We want a direct connection with the ground you move over,” says Roger Wood.

**‘Jungle Ruins’ Effect**

Noise panels (in the way they are patterned and assembled) have a fractured look, and this is intended to work better as they age and when natural road dirt and rain wash drips down the panels and streaks them.

“The idea is to have the effect of jungle ruins for some of the panels, as the vegetation grows around them and they are partly obscured,” says Wood. There is no point trying to retain, nor do the partners want to retain, a highly finished “architectural” look on many of the noise walls and panels.

The landscape design is carefully tailored to work with these elements, adds Dieter Lim, director at Tract.

“It tells the stories of the communities, both natural and urban, through which the road travels, capturing the stories in hills and valleys, the creeks and streams, and the original inhabitants.”

The landscape work aims to reflect the agriculture and industry

along the route and the changing time and seasons.

“Unlike other built elements within EastLink, the landscape will constantly change, growing and maturing over time. It will provide a changing backdrop and setting for the architectural elements as it matures,” says Lim.

Time and weathering effects are also foreseen for some of the rock cuttings.

“Where the rock has been cut, and stands on its own because it is strong enough, we have insisted that it be left with the natural strata pattern showing,” says Wood.

“If not then we have had it shotcreted, and have then painted the surface to simulate the same effect. We were a little uncertain about that but the painting has been very good and again the colours will weather down.”

Elsewhere, however, the natural look was changed. One technique for building bridges is the top-down method where large piles are drilled vertically from the surface and then filled with concrete before the earth is dug from around them. Columns formed this way have a rough concrete look, and for these a colander-like lozenge pattern steel cladding was used to improve the appearance.

One of the most dominant, but subtle, effects is the off-white and black finish for all the bridges. The parapets are done with a pleated effect, achieved by

using a contoured precast panel made with white cement for all of them: steel tubular barriers along those are a solid black colour.

“The same is done for all the exposed steel work on bridges and structures, and occasionally some of the concrete cross heads,” says Wood. Toll gantries and sign board supports are also done in black, and the result on the finished traffic road is a strong, clean feel. Achieving this effect has sometimes been a battle, and the architect had to be particularly insistent on the black finish for the steel work. Indeed, the work to achieve the desired finishes was considerable.

This was highly appreciated by the engineering design team at the contractor TJH, which found the relatively new experience of working closely with an urban designer less irksome than it might have been.

According to Ian Bryant, engineering manager on the southern half of the project, a good working relationship was established despite old traditions among some civil engineers that “architects just get in the way” with “fancy ideas”.

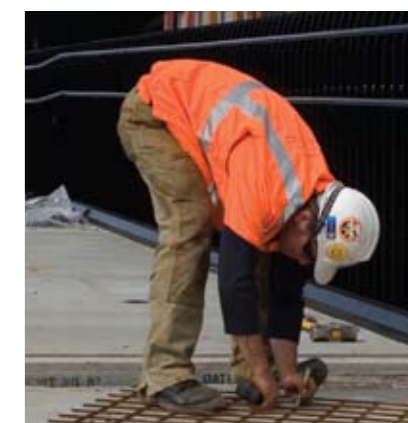
“And the Government made sure that the urban design was locked in effectively,” says Bryant.

The precise positions, heights and types of barriers, noise wall panels, facings and so on, were determined as the overall design evolved and the positions and line of the road and its bridges were pinned down.





No 23  
Acrylic sound panels were used where transparency was important to connect with the landscape. The orange, a colour from local tree bark, was used on the bridges



### Community's Wishes

The whole process had to pay attention to the community's wishes and environmental restrictions, accommodating as far as possible the desire for transparent panelling where, for example, significant views could have been cut off. Decibel limits for potential traffic noise impact also had to be addressed. These were determined by local measurements and computer simulations.

Transparent panelling was not appropriate everywhere and in trying to juggle all the demands, the design team found the architect flexible and pragmatic in working with it to deal with awkward aspects of the design.

A requirement for a certain shape and size of noise panel was modified, for example, because it was proving very difficult to cast in the precast works at the originally specified shapes and sizes.

Another issue was the requirement for the alignment of retaining wall facing panels along the straight edges at the top. This is not impossible, but it is difficult and time-consuming on site. A new concept with an irregular 'crocodile' back arrangement for the panel tops was found.

"They look equally effective but are much easier and quicker to install," says John Dauth, TJH structures design engineer.

Shelley Penn, SEITA's consultant and Associate Victorian Government Architect, says that Wood Marsh's huge amount of work helped deal with all these problems as the project proceeded. She was able to speak with the partners constantly, ringing up to discuss matters arising from the designs as she saw issues relating to the integrity and quality of the design concept.

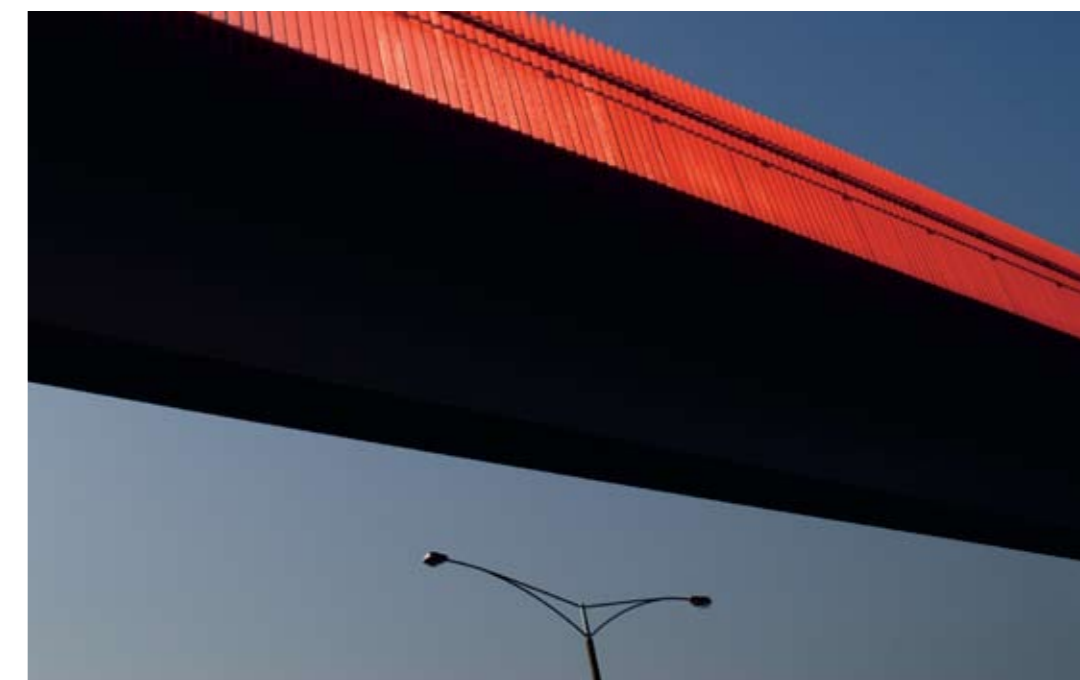
But while the architect was accessible and "reasonable," Roger Wood emphasises that this is very different from sacrificing the overall concept.

"At no point was our work being reduced."

The question of the basic black and white background colouring for superstructures was not changeable, for example, and buildability was not confused with reduced standards.

He says the partnership took an open approach, so that where the contractor's designers ran into a problem they could phone up "and we would go and sit down and analyse the issue and come up with a solution."

"The feedback we are getting is that people love driving the road. It is a result that the partnership is very proud of," says Wood.





# MILLIONS OF PLANTS

PLANTS AND WILDLIFE WERE ALWAYS GOING TO BE AN IMPORTANT CONSIDERATION ALONG THE EASTLINK'S ROUTE



When a burly excavator driver stopped his machine and waited patiently for a row of small ducklings to walk across the path of his excavator bucket, the landscaping teams on EastLink finally realised they might be winning.

Until then it had sometimes been difficult integrating the pressures of major muckshifting schedules with the sensitive work of planting and nurturing millions of seedlings and shoots.

But eventually, despite a few choice epithets colouring the air, it all came together.

Landscape design played a crucial part on the project. It guided the shaping and reforming of the ground that has to be done for a road project, transforming the rawness of engineered cuttings and embankments into what landscape consultant Dieter Lim describes as "a narrative for the road, responding to the natural rhythm of the landscape."

The symbolic moment when the suntanned muckshift crews paused to let the young birds follow their mother across the worksite demonstrated how even the toughest of construction crews would respond to the road environment as it began to mature. After all, the landscape is a key feature by which EastLink will be judged.

"How do people make up their minds about the road? The tolls certainly, and the smoothness of the ride, but to a large extent also by the appearance," says Neil Hordern, the manager for landscape with contractor TJH, who worked with Lim to implement the design on the ground.

Normally on a project, concedes Hordern, the planting and finishing work would be done in such a way so as to keep out of the path of the big earthmoving operations and concreting. Essentially it follows on, with specialist horticulturists coming onto site relatively late in the project.

But so much work was needed for EastLink (its area of parkland and open space is one and half times the size of Central Park in New York) that the planting crews had to work alongside the civil engineering.

"We were planting over three million plants and seedlings, known as tubestock. That is more than the number in Melbourne's botanical gardens," says Lim.

Ground treatment, ground preparation and planting are all time-consuming and so the work had to get on quickly. "Timing is everything with plants going in like this. The seedlings are all grown

in small tubes and are right for planting only at a certain size."

Potting is not an option "because if they grow much more they lose their viability once in the ground: bigger plants tend not to take as well and they require much more watering in," says Hordern.

They also cost four times as much for a poorer result.

For most of the plants on EastLink there was only a three-month window, he says.

"We once gave away 100,000 young trees to the local community groups because they had gone over. We thought they might at least green up the local neighbourhoods."

The seasons too were critical for survivability. Some rain at least was needed because "you can't irrigate two million square metres of beds." Autumn or spring was best, he says.

Ironically, however, one of the worst incidents he faced was from a freak summer rainstorm which washed down an embankment.

"I spent Christmas morning driving slowly along the project looking at quarter of a million plants on the road surface."

All this, of course, meant that procuring supplies was a risk-fraught business.

Plant selection was central to the landscape and started during conceptual design. Species were selected from an array of plants which were mostly indigenous before the first settlements of the area.

No 24 Robust local plant species have been chosen for aesthetic and practical reasons on embankments and reservations



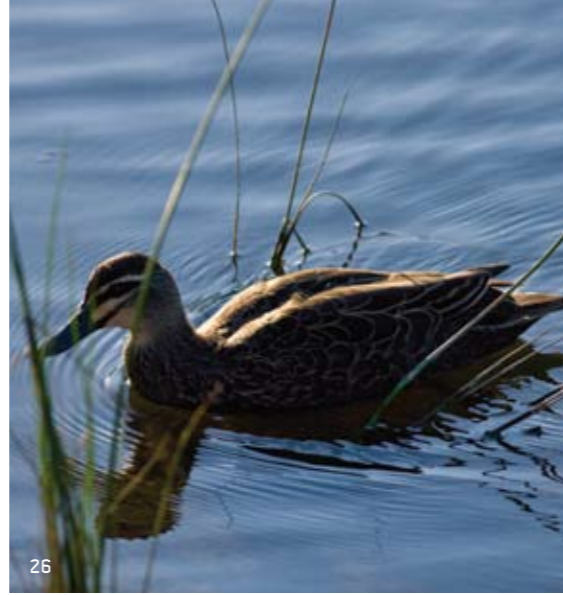


**No 25**  
The EastLink Trail runs through the pristine bushland of the Mullum Mullum valley, preserved by the tunnelling of the road beneath



25

**No 26**  
Wildlife was already colonising the wetlands before the work was complete



26

**No 27**  
Wetland spaces provide new recreational facilities, as well as important run-off areas for the road during rainstorms. A careful filtration system is part of their structure



27

“These were an important starting point as they set the base line vegetation context for the project,” says Lim.

“You could describe them as a foundation telling the story of the early land upon which the layers of change, agriculture, industry and urbanisation can be told.” Such stories layered over the road underpin the landscape design philosophy, he explains.

The basic spectrum of species was then modified to reflect the changes in geography along the corridor.

“EastLink travels from the foothills in the north down to the floodplains in the south, moving through creek and river valleys with different plant communities along the corridor.”

The choice was further modified (for practical reasons) to select plants that were robust enough to handle the extreme and sometimes hostile planting conditions of a roadway. Steep batters, minimal topsoil, and even rock embankments, are tough conditions even for indigenous plants.

Plants were “weeded” out from the list and the more robust types underwent growing tests by local nurseries and ecologists, to spot “wimps”.

Planting choice also offered cultural cues such as the existing windbreaks of trees in the agricultural areas in the south. “These were represented within the landscape design with the 30 metre high River Red Gum that was a predominant tree species of the area,” adds Lim. The tree lives to around 500 years.

Plant selection also paid attention to the need for huge volumes of seeds. The challenge was propagating hundreds of thousands of plants, large and small. Seed was collected from the wild by specialist licensed seed-takers who knew where to find pockets of natural plants and how to leave enough in the natural environment not to harm it.

Drought was already a problem for this operation, and then there was a series of bush fires.

“Plants tend to suffer stress in drought and throw out lots of seeds for survival. Often the seeds are sterile: they throw out blanks. Sometimes only 5% or so will germinate,” Hordern explains.

The landscape design used alternatives of a similar structure, size and appearance to cover for the nominated species in case some species could not be propagated.

Orders were placed with nurseries around Melbourne, particularly on the west side of the city, which has less rainfall, to harden the plants off so that they could cope with the extreme growing conditions.

Meanwhile, on site, preparation was everything. Vegetation on many civil engineering projects falls down because the ground condition is unwelcoming.

“Major earthmoving leaves the ground devoid of oxygen and you don’t get root growth,” says Hordern.

The secret is ripping and turning over the ground thoroughly and that has probably been done more effectively on EastLink than almost any project. The result was already clear at the time of opening with strong growth and a majority take for the plants on the embankments and slopes.

Mulching was another key to success, which on a project like this meant the kind of wood chip mulch seen in parks and formal gardens to suppress weeds and retain moisture.

“We virtually stripped the local garden centre of mulch,” he admits. In the end the project acquired an American mulching plant which could be fed with timber waste.

### The Wetlands

In the wetlands, the row of young birds that drew out the tenderness in the otherwise “robust” muckshifters came from one of the many new ponds and marshes that line many parts of the new road alignment. Ducks and other water birds have settled in, especially around the old creek beds and flood plain areas which have been realigned and rehabilitated though all parts of the project.

These wetland areas are required first and foremost all along the route for technical reasons: to provide storage and water purification for the road run-off when it washes from the road surface during rain storms.

Some of these were formed early on to trap run-off from the construction activities, with settling ponds to remove coarser sediments, and secondary ponds for post-treatment with flocculating agents. Clear water went back into the creeks under a regime of environmental care which has been a priority for the contractor.

Permanent treatment for road run-off relies on similar principles of natural drainage and filtering, using so-called Water Sensitive Urban Design principles, says John Dauth.

Along the project there are around 60 wetland areas derived this way, and particularly along the Dandenong Creek and in the flood plain area at the Frankston end of the project.

Carefully selected species of reeds and rushes act as filters, trapping finer particles, and also breaking down various pollutants and organics both in their root systems, and by the microbial organisms that live on them.

Other types are “dry” biological remediation areas with water soak ways into sandy ground which also contains micro-organisms, again treating the water.

All these wetlands and creek realignments “provide a valuable environmental asset with recreation potential, aesthetic possibilities and habitats for bird and animal species,” says Lim.

“This is where the design team truly collaborated, where the engineers designed functional wetlands which were then integrated through the landscape design into the environment to create a seamless visual experience.”

In places, full-scale features have been made of the wetland ponds to enhance the local areas and add interest to the EastLink Trail.

Most notable is an area about half-way along the project at Oakwood Park. Working in conjunction with the local council, the area was made into a nicely shaped recreation park with ponds, assorted boardwalks and rustic furniture. There is also a children’s playground.

The landscapers used some of the timber from trees which had to be removed from the alignment to make the furniture, so that it was retained on EastLink. Other trees were placed, as they are, including a number of “scar trees”, which are Australian aboriginal artefacts, where trees have had the bark removed for signalling and communication.

The ponds have a major effect on animal life too, and it was eye-opening to see how quickly various species moved in to colonise the vegetation, says Hordern. Frogs, yabbies (small crayfish) and other animals appeared and gradually the bird species too, helped, it is said, by placing some wooden duck decoys on the water to attract them.

“There are herons and black swans too and even we hope birds of prey to come,” adds Neil Hordern.

It is enough to soften the heart of the hardest hard-hat.





No 28  
Land shaping and planting was integrated with the architectural features of the road, to bring the history of the landscape into the new road design

## Environment, Flora and Fauna

EastLink is more than a road: creating a linear parkland of 500 hectares, which is a total space greater than the parkland in the relatively green inner city of Melbourne.

In the southern half of the project many of the areas outside the road boundary constitute farmland, and there are stretches of wetland and creek beds running alongside.

Taken as a whole, the road creates connections between all this and gives various species the chance to move up and down the 39km long space, including the famous duck-billed platypus, now a protected species, and the animal which Australians say “proves that God has got a sense of humour.”

To further help the free movement of the animals, the road design includes

a number of creek conduits under the carriageway and in one place a culvert with ‘skylights,’ a grid-covered well from the surface, which allows light and air movement into the space below. Even though the animals move at night they are cautious about entering apparently enclosed spaces and the openness of the skylight allows them to pass.

Alan Sann, a consultant environmental manager for ConnectEast, says that the southern end of the project is considered an important environmental zone, its flood plain constituting a remnant wetland and an important zone for migrating seabirds. It was subject to “controlled action” under Federal law which imposed strong constraint on the operations by the contractor.

“I have to say their management control and overall performance matched up: it was one of the best construction projects I have seen in Australia from this perspective.”

One feature of the wetlands was some rare species of herbs, which were located and transplanted to a protected area.

There are some other animals of importance found along the EastLink corridor. “There is a chance of brush-tailed possums, and part of the landscape work was to locate trees and fallen trunks that might harbour these animals, and mark the trees for salvage. They were moved into reservation areas alongside the road.

“We have plenty of rabbits and foxes too, which you would want to discourage.”

ConnectEast has been cooperating with both Parks Victoria, which manages some of these areas, and Melbourne Water, responsible for the creeks. With the latter the Concessionaire has devised a clean-up programme for many of the off road creeks.

“It came about from walking along the EastLink Trail from where it was noticeable how degraded some of these creeks have become,” explains Sann.

Surprisingly, he says, the degradation of the creeks has not entirely defeated the local platypus population which seems able to survive the rubbish, if not polluted water. But the programme will help them as well as vastly improving the visual amenity for walkers and cyclists.

Finally, but emphatically not least, there is the Mullum Mullum Valley at the northern end of the project which is the biggest environmental contribution the project has made. Its preservation is the rationale for the expense of the tunnel, and it will remain as one of the most important pristine bushland areas in Melbourne.

“It is a lovely area and I used to go there myself frequently at lunch times to walk when I was working on the Eastern Freeway Extension Project for VicRoads,” says Les Bull, SEITA’s director of engineering for the northern half of EastLink.

The space divides into at least three distinct areas: Hillcrest Bushland, Chaim Court Bushland and Yarran Dheran. Each has its

own features and “for the expert eye a range of particular species of plants and orchids.”

The valley’s value, ironically, lies precisely in its preservation on a designated corridor for the road, because the State let it revert to near natural condition around the creek running through it. Its retention now is a prime example of the “law of unintended consequences” in human affairs, with strong passions raised around the idea of concreting over it.

That it remains and is now a protected park at the suggestion of SEITA is part of the achievement of the EastLink project, and a major contribution to the city.



# EXPLAINING EASTLINK

## TELLING PEOPLE WHAT WAS GOING ON DURING CONSTRUCTION WAS A HUGE COMMUNICATIONS EFFORT AND WAS DIVIDED BETWEEN THREE TEAMS

Unlike the work of the architects, civil engineering designers and constructors on a big project like EastLink, the efforts of the communications teams and community relations staff leave no tangible results.

There is nothing concrete like bridges, tunnels or highways curving into the distance to show to people afterwards.

But on this project at least the unseen legacy is enormous.

Lives were going to be transformed as a quiet corridor of green and empty land was turned into a busy motorway, sometimes close to people's homes.

Although it was always known this would happen (the land has been designated for future transport use since the 1960s) it was still an upset when a future option became a certainty and then a reality.

On top of that, potentially disruptive, sometimes noisy and dusty, disturbing work on Australia's biggest road project was going to intrude on lives and daily activity for four years before any of the benefits would materialise.

The project was kept going at a record pace: the inevitable upset and community complaints addressed promptly and sensitively.

Many of the community's concerns were addressed early on by talking to people, informing them of what was happening, and equally, listening to their concerns.

Such proactive work during construction was complemented by an equally comprehensive strategic information campaign about the road itself, its development and the changes it would make, by the Government, ConnectEast and Thiess John Holland.

The three-pronged programme was crucial in helping a wider scale long term transformation of attitudes and feelings about the project, turning early controversy and hostility into not only anticipation for EastLink but also a sense of local ownership in the achievement of the new facility.

This is all built on the quality of the new highway and the great improvements it offers in journey times and ease, as well as amenities and appearance. But without

the links that have been established with people in the half a dozen communities and neighbourhoods along the way, it could certainly have turned out very differently.

These go well beyond the usual understanding of public relations and information provision: on this scheme the communications teams built close interactions with the communities to draw in information as well as tell people about the project. Local forums, discussion groups, council meetings, group presentations, tours, and one-to-one meetings all complemented the usual provision of newsletters and information centres, though these were important too.

All three of the project parties ran websites with information, aerial photography, maps and interaction sections helping to reach the population and draw their interest. The sites were particularly useful in helping people grasp the scale of the project and its progress.





## 'Hotel' by Callum Morton

"...NEVER QUITE OF THIS WORLD."

**Description:**

Steel structural frame, concrete and glass panels. 12 metres long, 20 metres high and 5 metres wide.

**Location:**

Adjacent to the northbound carriageway, between Greens Road and Bangholme Road.

**The artist said:**

"Hotel is effectively a giant folly. Motorists will view it from the car as an actual hotel and perhaps over time as a strangely de-scaled prop that has escaped the theme park or film set."



## 'Desiring Machine' by Simeon Nelson

"A COLLISION OF ABSTRACTION AND ORNAMENTATION..."

**Description:**

Galvanised steel plate, 36 metres long, 9 metres high and 8 metres wide.

**Location:**

Adjacent to northbound carriageway, south of Thompson Road, near Boundary-Colman's Road.

**The artist said:**

"Desiring Machine is a fallen tree/tower lying by the roadway. It is a crashed relic of machine-age desire putting down new roots into the earth and unfurling tendrils from its architectural radii and sections."



**Demonstrating the project**

ConnectEast and SEITA have continued their websites following completion of the project, and the Concessionaire's site in particular plays a major role in day-to-day operations.

There was more too. A general ethos was deliberately established on the project of "communication by all those involved." At the government client end the engineers and communications team have spent considerable time explaining and demonstrating the project to people at all levels, answering queries and reassuring them about its impact.

Like the urban design requirements and the toll level limits, the emphasis on community relations was written into the project from the beginning, at the insistence of SEITA and as part of the concession deed. Beyond that it was part of the contract requirements for the design and build work by the contractor.

The communications effort was divided between three teams at SEITA, ConnectEast and the contractor, working together but with their own areas to focus on.

But all three overlapped, especially with information on the project and interactions with the local communities.

"It was a team effort," says Megan Cusack who headed up one of the biggest teams at TJH, the contractor. "We divided up the work into obvious concerns we each had but shared what we were doing."

Her remit was two-fold: the day-to-day issues of construction disturbance, and covering the way the road changes would impact on homes and localities. Exact details on this became clear as the design work in the contract proceeded, and the concept of the road hardened into precise shapes and sizes.

"The biggest issue was the noise walls," she says. It is a contractual requirement that the noise from the road is limited and that means the provision of kilometres of noise walls, some as high as eight metres.

Where these came close to homes there was concern about the views that might be blocked; about security and about the possible overshadowing of gardens and streets. Some 3,000 properties were affected and Cusack's team, with six regional managers for the six sections of the project, made huge efforts discussing with people where the walls would go.

"We tried to take into account people's concerns as much as possible, and changes were sometimes made to the designs," she says. For example, sometimes requests to have transparent acrylic at the wall tops were acceded. But the road had to go through, and very often "it was a question of managing people's expectations."

Just how people would be affected was set out in information packs sent to homes. They explained the different wall types and colours.

"We had drawings showing how close people would be, but we also made use of a GIS system that showed the location of the roads and houses and allowed people to see quite well how their own homes would be affected."

Another design issue of significance was the tunnel under the pristine Mullum Mullum Valley, and in particular its ventilation structures and the impact they might have. For this the contractor had a 3D model developed by a team at the Royal Melbourne Institute of Technology showing the design and allowing "fly through" around the stacks and the landscape.

"People could see how it would look from their own houses and this was very successful. We had almost no complaints about the height and appearance of the vent stacks when they were being built."



**Significant Impact**

A 3D model was also used for the area where the control and headquarters building for ConnectEast was to be built.

Perhaps even more important than this work was the effort to keep people informed of the impacts of construction, particularly when there was going to be night work with bright floodlighting or noise, or very dusty earthmoving work.

Advance warnings were sent around, when necessary by letter, to complement regular newsletters, and if there was a sudden change Cusack's team would door knock affected areas. For particularly concerned residents there was also an email service, says Cusack.

The team also has a hotline phone service. This was required to have a 24-hour response in the bid terms but the contractor's team upped that to answering all complaints or inquiries within two hours, something Jo Weeks, the SEITA director of communications, describes as "setting a new benchmark."

All these inquiries were required to be logged in a database, ensuring a proper record of community concerns. Cusack could then approach the contract team with hard information about possible upsets that should be paid attention to.

A major area for disquiet and concern was the tunnelling work, which raised fears about noise and vibration, especially when there was blasting to be done. Tours around the tunnel were arranged for residents so they could see and understand what was happening and what was causing the rumbling noises beneath their feet. In some cases the contractor offered to re-house people during the works.

"In some circumstances the regenerated noise could sound like an aeroplane taking off," says Cusack.

Alerts were developed using email and by texting messages to people's mobile phones a few minutes in advance of blasting work, during a short period of the job when drill and blast was being used.

Dust became a particular issue in the contract period because of drought conditions in the region, and particularly on the open, flatter country at the southern end of the project. Good weather might have been good for schedules but it had a downside, and wetting down and dust suppression became critical.

"Very occasionally we even stopped work but it was more a question of taking measures to deal with it, including chemical sprays," says Cusack. Water was scarce.

Maintaining relationships with busy engineers and construction managers was crucial for this. Cusack and her officers had to make sure they were known within the huge construction effort.

But they also spent a lot of time in the communities. As well as responding to inquiries, the teams worked with local groups.

"We made a big effort to do a roadshow for the local councils and to establish key contacts in those," she says. There were also regular forums.

"We also set up Community Connect forums in the areas made up of people who lived there. We tried to choose people who would have a network of relationships themselves through sports clubs or because they were local business people so that they could reflect issues on the ground and pass on information."

This latter initiative overlapped with the work SEITA was doing. SEITA set up communications with all eleven municipal councils along the route.

"We would have regular catch-ups with the chief executives and officers of these councils," says Weeks.

A community advisory group was also set up, drawing on senior representatives from the councils, the three EastLink bodies, and community representatives, which could raise and discuss a range of issues on the design of the road, its construction and implementation. The group was overseen with great finesse by independent chairperson John Nichol, a former senior local government engineering executive who possessed the right qualities to manage sometimes differing interests and personalities.

"We could also run things past them that might be coming up and there were site visits and presentations about the project."

The community advisory group met some 50 times during the course of the project.

SEITA also looked to the more general transport industries' representatives in a quarterly industry group, the Peak Roadusers Forum, drawing in bodies like the Royal Automobile Club of Victoria; the Victorian Transport Authority; Bicycle Victoria, Transport Workers Union and the Bus Association.

SEITA also organised site visits from many national and international companies and government organisations. These tours were hosted by a variety of senior SEITA figures, in particular Ken Mathers.

Media communications were an important aspect of the project. It involved talking and responding to both local and state newspapers, TV stations and radio, to communicate key milestones to the general public.

SEITA also ran its own website with interactive elements including a travel time savings and toll payment calculator as well as interactive street and aerial maps of the project.

"We also ran an information centre at the SEITA offices, which proved highly



No 32  
Every effort was made to keep nearby residents informed of the impacts of construction





popular,” says Weeks. The centre had maps, information displays, video and publications about the project and its progress, and importantly could call on Weeks’ team at any time during the day to meet visitors and talk them through the scheme.

Individuals popped in to the display and equally, groups including school parties made good use of it, says Weeks.

ConnectEast also created a permanent display, but it looked to do something that would reach many more people. It set up a travelling display that proved popular with people living along the corridor, says James Tonkin, the ConnectEast general manager of communications.

“The mobile display went round to all the major shopping centres and town centres in the region over the project time span.” It reached over 40,000 people. There were DVD fly-throughs, brochures, maps and information as well as someone on board the travelling display vehicle to answer questions and give information.

“Actually going to people rather than having them come to us was an important feature,” he says.

The philosophy was echoed in the choice of five major shopping centres as retail outlets for setting up toll accounts and purchasing the electronic tags needed to use the road, “rather than making people stop in some remote place off the highway,” a point made by John Gardiner, the managing director of ConnectEast.

The same shopping centre locations were also useful information points for ConnectEast in the run up before toll account sales began.

The community contacts were built up in other ways too, by attending local fêtes and one-day community festivals, setting up a stand and letting people become acquainted with the road and its operator. Like its

counterparts, ConnectEast produced written material as well, including a quarterly newspaper distributed to over 600,000 residents in the project corridor.

As part of the concession ConnectEast was committed to two open days on the road, one in 2007 and one in June 2008, a few weeks before the opening. Both events allowed people to see the road first hand, look around and visit displays and marquees and talk with project teams.

The first event was held at the Ringwood interchange in May 2007 and attracted 21,000 people, “which showed the great community interest and anticipation,” says James Tonkin.

The second event, held immediately prior to opening, included a public walk through the tunnels, a fun run, cycling events, roaming entertainers and information stands. This event proved overwhelmingly popular with around 150,000 people turning up for the unique chance to walk, run or cycle on EastLink.

Melbournians took up the once-in-a-lifetime opportunity to cycle along EastLink on the second open day. The event was extremely popular and became the largest cycling event ever held in Australia, attracting around 45,000 riders.

#### Focused on the future

As might be expected from the operator of the road, an important part of its role was to inform the public about when the road would begin service, how they would be able to use it and how the tolling would work.

“We were also simply raising the profile of ConnectEast, both in the community and in the wider context around the city,” says Tonkin. Numerous presentations and local industry awards were set up with the aim of establishing the identity of

the Group within the business community, an important customer base and within the infrastructure sector.

“We are here for the long term and so there was a need to establish our commitment to the road and to the local community.”

As construction wound down and the road moved into its operations phase, his team’s efforts switched to gearing up during the first weeks of operations, and helping to manage issues with customers and along the road as it prepared for full toll operation at the end of July 2008 following the four-week toll free period.

“The initial weeks of road use brought a flood of community enquiries concerning customer products, road signage, landscaping and customer services.”

Much of this was to do with the communities familiarising themselves with the road, he says.

Information focused on how the road was working, travel time savings, convenience and other community benefits.

Tonkin was pleased with the positive coverage the road received on statewide and local TV and newspaper coverage in the first weeks of operation.

“We estimated that this coverage was equivalent to over 50 minutes of unpaid prime-time news and contributed enormously to raising awareness about the new motorway, building a sense of anticipation around its opening and to the high volumes of initial traffic using EastLink.”

The team is settling down for the long haul of day-to-day operations: there are another 35 years to go.





AS A MAJOR SERVICE PROVIDER, CONNECTEAST HAD TO MAKE SURE EVERYTHING WAS IN PLACE TO DEAL WITH ITS CUSTOMERS

# BEHIND THE SCENES

For Concessionaire ConnectEast, a high priority as construction got going, was to establish its presence in the community. It would after all be a major service provider in the years to come alongside the utilities and transport companies.

“We needed to be ‘right there’ in shopping centres and residential areas, proactively providing information and establishing a friendly identity,” says John Gardiner, managing director of ConnectEast.

From the moment it opened, the motorway would be used by tens of thousands of vehicles, each paying tolls which have to be collected and collated.

So, quite reasonably these customers expect a decent level of service from ConnectEast as they set up accounts, receive their electronic tags, or pay for one-off journeys.

Systems and staff were needed that could work the toll collections, issue and track individual accounts, and liaise with the customer base, dealing with their problems and explaining how things work.

“Service is paramount,” says Shirley Robinson, customer services manager, who has

co-ordinated all the backroom customer elements for ConnectEast. A front-line provision was in the retail toll outlets, located in neighbourhood shopping zones rather than along the motorway, as is often the case.

As well as the five shops at opening there is one motorway stopping point in the futuristic headquarters building for the company, the distinctive EastLink Operations Centre. The outlets all served a double function: providing information services during construction about the road and how it would work, and then as opening day came closer, increasingly operating sales and setting up of accounts.

“That allowed us to be ‘right there’, rather than alongside the motorway where the drivers would have to find us,” says Gardiner.

But community outlets are only a part of the story. There is also web-based communication, with updated information, and an interactive portal for sales and inquiries. ConnectEast encourages its use with a larger discount offered for opening an account on-line.

In addition there is a contact centre with 24-hour, seven-days-

a-week live telephone responses for customer information, accounts and service. Setting up this centre with its 130 staff was an early task for Robinson, who began building up and training the backroom teams in 2006, starting with the appointment of a contact centre manager, who then directly recruited and trained the staff.

Behind the scenes there was more to be done. Although the electronic toll monitoring and measurement system is a state-of-the-art computerised system, it still needs a human interface, so that a credit and billing process can access the information required and monitor individual accounts.

Learning the complex processes of the newly-developed toll system early on and during development running trials to test them out and give feedback to the technical teams, kept the staff busy.

Long before the road was up and running, they were familiar with the system. A key figure here was a business analyst to interface between the computer jargon of the systems’ engineers and the user teams.

Alongside is a manual image-recognition team.

Some tolls, particularly from one-off users, are not determined by electronic tag signals but by number plate recognition. There are always a proportion of errors in video recognition, even though the latest systems keep those to a few per cent.

Mis-read and unrecognised images will be passed to a team of human operators trained to identify the car number plates in difficult images.

Among these operators, some are hearing-impaired workers, employed by the company as part of its human resources policy. Managers and floor staff were taught Auslan sign language to help them fit in properly.

Recruitment policy in general for the 270 backroom staff has also been to draw in the community. A mix of 60% full-time staff and 40% part-time allows ConnectEast to cover its peak workloads. But rather than use agency workers, says Robinson, the Group has recruited its own part-time network of retired people, students and others who can be on call for when they are needed.

“There is far more enthusiasm and commitment to the job doing it that way,” says Robinson.



# FAST-PACED AND TIGHTLY PLANNED AND CONTROLLED

## AN AGGRESSIVE TIMETABLE WAS SET WITH THE AIM OF COMPLETING EASTLINK EARLIER THAN SCHEDULED. IT WORKED

For TJH, the biggest challenge of EastLink was to deliver the A\$2.5 billion construction program as efficiently and quickly as possible.

It was in everyone's interest to finish the work fast, and an aggressive timetable was set, driven especially by project director Gordon Ralph.

"This was a reasonably conventional type of contract. But this is a toll road and so there is a commercial imperative to be running as soon as possible. There were substantial penalties for any over-runs and of course bonuses were agreed if it could come in early," says Graham Gilpin, the ConnectEast general manager construction who co-ordinated the design and construction for ConnectEast.

The challenges were not overly complex, says Ralph, at least not on the civil engineering side. Tolling was another matter and the contract team had to develop and test a state-of-the-art electronic system that had rarely been used and certainly never been done on such scale, a notoriously fraught enterprise particularly for the software required (see separate chapter).

The engineering challenges included the tunnel under the Mullum Mullum Valley and a complex bridge slide, needed for a railway

crossing at Ringwood. Some of the bigger interchanges were complex too, especially the Monash Freeway interchange which had to be built around a busy live road without disrupting it.

But even these did not face exceptional obstacles. The real issue was mobilising and controlling the resources for an entire length of road over 39km with 88 bridge structures; hundreds of thousands of square metres of road base and asphalt; cuttings to excavate and spoil to move; 28km of noise wall to design; manufacture and install; landscaping, drainage and services; and the coordination with the mechanical and electrical installation (M&E).

"It all had to be under full production to achieve the result." Some great early work was done by original project director, Chris Herbert. TJH had established its corporate headquarters and divided the physical works into six regions to tackle each with its own full staff – project management, construction engineers, quality management, environmental management, safety management, traffic engineers and so on. Each also had its own communications people. Chris also focused on developing a strong culture of safety first and the establishment of important relationships with stakeholders.

Though there may have been a little competition between regions, this was not the intention, and the central project office coordinated the resources between them and provided overarching services and control.

Don Johnson, TJH general manager for operations, says: "A watchword was that project comes first." Machines or other resources would be shifted to the areas that were most important for the overall critical path.

The contractor bought significant quantities of plant, more than A\$70 million worth, particularly dozers and graders considered critical for the work. Australia has a healthy hire industry but could not have guaranteed the quantities needed.

One significant piece of equipment was the large German 'Demag' mobile crane bought for around A\$3.5 million. It was so large that it exceeded Victoria's road axle loadings and had to be given special permission for import.

But with capacity to lift 500tonnes close in, or 100tonne or 200tonne loads on a long reach, it proved vital for bridge construction. The use of the crane, nicknamed "Snow White" by local school children,

helped the design teams standardise their bridge beams at a maximum of 130tonnes for example.

That worked in conjunction with setting up a precast yard in Morwell, around 130 kilometres from EastLink, where the rapid production of beams allowed a faster, better quality assembly of the project's many bridges. All but a few of the major road bridges used the components and only two or three of the longest interchange ramp bridges involved a different design where steel beams were used. The pedestrian bridges, and many smaller bridges on the EastLink Trail, were also in steel.

Controlling all this was "simply a matter of detailed and precise planning," says Johnson, and constantly analysing and adjusting the programme.

"Project-wide run rates become very important, for asphalt, for noise walls, for length of guard rail erected and so on.

"It is very basic really, making sure the resources are on site at the right time. It sounds horribly simple but people don't always do it."

Helping all this was a special one-off industry agreement the contractor struck

with the construction unions early on. This freed up a provision in Australia for "lock down" weekends whereby the industry is guaranteed particular holiday and weekend times during the year. In return for higher rates and site allowances on the job, flexibility in time-off was allowed which gave the contractor's management the scope to move around resources as needed.

"The only drawback was when you needed a sub-contractor in there as well," says Ralph. "Their crews were still working to the standard calendar."

The project team is extremely proud of the end result – the project came in five months early, though Ralph would have liked to have achieved an even tighter result.

They hit very high levels of production, A\$100 million per month for a sustained period, "which I was told was impossible. But we showed them."

It is a positive result for the whole Australian industry, says Johnson. It gives them the confidence to go and tackle world projects and some of the other big ones now happening in Australia.

No 35  
Traffic diversions had to be thought through carefully for the construction of the major interchanges. Dozens of traffic patterns were used





# GORDON RALPH: A PROFILE



Gordon Ralph is project director for TJH.

He joined the project in September 2005 following the early establishment of the TJH workforce by Chris Herbert.

An old-style construction boss with a strong focus on driving to the finish would not be an unfair description for Gordon Ralph, who commuted from Sydney for a six-day week on Australia's most intensive project.

It was partly due to his tight management and insistent schedules after joining the project that the road construction came in successfully nearly half a year early.

The achievement comes from years of experience in the industry. A practical focus began with an ambition to be a carpenter but he was persuaded that he could not leave school at 16 and chose a path through civil engineering instead. Study at New South Wales University in Sydney led

to a couple of years road building for the NSW State Government but he grew frustrated and "bought myself out".

Contracting jobs on mining schemes in Queensland were followed by the Australian world adventure, "tourism stuff till the money ran out".

Then there was experience on oil rigs in the North Sea, and work in Indonesia on sugar refineries, followed by similar work in the far flung reaches

of Afghanistan at the end of the 1970s, a year as the only westerner in an incipient civil war, he says.

Then it was back to Australia for work on earth fill dams for around five years until he joined Leighton Contractors in 1985. There followed a 22-year career. In 1997, he took on the Eastern Distributor Project in Sydney, a \$600 million, finance, design, build, own and operate project comprising a 6km long urban toll road linking the city centre to the airport and including a 1.7km tunnel.

It was good preparation for leading one of the bids for the EastLink project, which he began in 2003 after completing another three years as operations manager in New South Wales.

After being part of the losing bid, he later joined the Thiess John Holland team to take on what was then Australia's largest urban road project.



## Artists' impressions

It is always a mistake to say "nowhere else in the world," but surely nowhere else in the world have major artworks been specially commissioned and placed by a roadway as part of its overall design and appearance. For EastLink, however, there is nearly A\$6 million worth of art. Four giant pieces are placed by the road at key points and are highly visible from the passing vehicles. Another eight smaller works are sited along the EastLink Trail to be viewed by walkers and cyclists.

A small committee consisting of ConnectEast director Yvonne von Hartel AM (Chair), Janet Holmes à Court AO and EastLink architects Roger Wood and Randal Marsh, was created to commission and choose the works. "The bid to the Government for EastLink included an offer for public art and ConnectEast has very much embraced

its public art commitment," says Yvonne von Hartel. "Safety and visibility were instrumental in selecting the locations for the four large artworks."

The large works are located in the southern half of the project where the road moves out of built-up residential and urban areas and travels through open land, parks, industrial estates and flood plains. Noise walls and other design features are less frequent here and there is space to provide the works, says von Hartel.

"The brief was to select young Australian artists who were establishing their careers and give them the opportunity to submit proposals to the Committee. We chose four locations and asked eight artists to develop submissions, meaning each location would have two submissions," says von Hartel.

"The end result is spectacular with four very different responses to the brief and reflects the skills and talents of the final four selected artists – James Angus, Emily Floyd, Callum Morton and Simeon Nelson

"The commissioned works are intended to be both challenging and stimulating," says von Hartel. Another eight works were chosen for the EastLink Trail; a mix of purchased exhibited work and specific commissions for new pieces of art. The selected works are by artists Inge King, Alexander Knox, Mitsuo Takeuchi, Campbell Robertson-Swann, Matt Calvert, Jos van Hulsen and Ashika Ostapkowicz and are sized to suit the smaller and more intimate surrounds of the EastLink Trail.



No 36  
A favourite already with children is the "big bird" sculpture officially called "Public Art Strategy" by Emily Floyd



# VALLEY'S COMPLEX TUNNEL

**A TUNNEL WAS DEEMED  
THE ONLY WAY OF PROTECTING  
THE ENVIRONMENTALLY  
SENSITIVE MULLUM MULLUM VALLEY**

In engineering terms the A\$400 million tunnel under the Mullum Mullum Valley was the most complex of the EastLink construction work: the largest single element and a project in itself.

“When the original proposal for a surface road proved an unacceptable option, various tunnel options were examined,” recalls Les Bull, SEITA’s director of engineering for the northern half of the project, which includes the tunnel.

Eventually, a 1.6km long alignment was chosen with three lanes in each direction.

Twin tunnels with diameters of over 16 metres were required, each with a special ventilation building at the exit end and large fans to capture the air leaving the tunnel and the car exhaust contained in it.

This is dispersed from the tunnels through 47 metre tall ventilation stacks.

By constructing the ventilation buildings early, and fitting them with special roller doors which could be closed at night, the sound of the machinery in the tunnels was contained to no more than the required 10 decibels above background.

The ventilation buildings were also big enough to stockpile rock excavated overnight, and this was removed next day by trucks, along with excavated material from the day shift.

## Roadheaders at work

Excavation was undertaken by four large machines known as roadheaders. These have a rotating head with cutting teeth at the end of a pivoting boom for cutting away the tough rock in front.

They also have scoop arms at the front and conveyors to the back to load directly into the dump trucks. Some blasting was also done, particularly where the rock was too hard.

Jenny Carbery, SEITA’s senior project engineer for the tunnel, explained that a mobile phone text system was devised to alert people a few minutes before a blast took place.

Stringent site work practice and other safety measures in the tunnel proved highly successful in creating a safe working environment, a significant achievement in one of the most dangerous sectors of civil construction.

Once a six metre deep ‘top heading’ was excavated by the roadheader or blasting, the rest of the tunnel depth was removed in what are called benches, using excavators fitted with hydraulic breaker hammers.

The tunnel also was required to be fully ‘tanked’, meaning watertight, rather than allowing water in and then draining it out.

Achieving water tightness involved having a circular cross section for the tunnel and using a drainage blanket and waterproof membrane lining, says Ed Taylor, a John Holland engineer who was tunnel engineering manager for the project. This was placed behind a permanent inner concrete lining.

A system using curved precast concrete floor units, sitting on temporary blocks on the membrane, allowed a flat top to be constructed so that trucks could run by. Temporary rails on each side supported two gantries in each tunnel to assist with construction including concrete pouring.

The construction of cross passages between the main tunnels every 120 metres (essential for safe passage in the event of an incident) also meant trucks could pass between the two main tunnels carrying materials.

Site build-up for the tunnels, which have state-of-the-art incident detection and monitoring equipment, started in February 2005. The first heading was excavated by August that year, and breakthroughs occurred in October and November 2006. The tunnels became operational in June 2008.



**No 37**  
Full “tanking”, waterproofing with a membrane, was used for the tunnel to ensure a minimum of leakage problems and the highest levels of safety

**No 38**  
The powerful roadheaders carved the rock away with their multi-toothed rotating pick-axes

**No 39**  
Tunnel construction, always dangerous, was done essentially without a single accident



## THE HEAVY RAIL CROSSING FOR THE BELGRAVE/LILYDALE RAIL LINES DEMANDED INGENUITY AND CAREFUL PLANNING

# THE RAIL BRIDGE SLIDE

Most of EastLink's 88 bridges were kept as simple and straightforward as possible. Precast was used for speed and economy, with logistics and sequencing the uppermost challenges for their erection.

But the Ringwood rail bridge demanded much greater ingenuity and careful planning due to the heavier loadings it had to support once completed. SEITA also required the design to allow for future expansion of the line from two tracks to three tracks.

To achieve this, TJH built the entire bridge 14 metres to one side of the existing track and then, when it was ready, slid it into place using powerful jacks.

The rail line, operated by Connex, was shut for short periods but otherwise it remained operational following a programme devised early on by engineers.

Essentially the foundations and final columns of the bridge had to be installed first and then the crosshead supports for the bridge deck.

The foundations for the four-span bridge comprised 1.8 metre diameter bored concrete piles which could be installed outside the train 'envelope'.

Pairs of the piles at each of three pier positions and for the abutments were put in through the existing train embankment. They went into the ground as support

but stood free in the top few metres once the ground was excavated around them, forming the columns of the bridge.

The job was difficult because the piles' heavy steel reinforcement and connections had to be done with unusual precision to allow the crossheads to slot in later.

The site was prepared for the cranes and excavators needed for the weekend operation so that everything could be carried out in a tightly controlled sequence, and on time. Over 200 men and dozens of machines, cranes, excavators and trucks were involved.

The 500tonne crane, 'Snow White', used throughout the project for bridge construction, was required for lifting the heavy crossheads.

"First task in the possession was to rip up the entire train track, and then to dig trenches for the crossheads so they could be positioned on the piles," says Matthew Gault, the TJH project manager for the Ringwood section of the project.

All that had to be replaced and the tracks relaid by the Monday morning peak period.

The second possession, just after the Christmas break, involved sliding the new bridge superstructure, complete with rail tracks and ballast, to the new alignment thus replacing the existing track.

The new superstructure had been built alongside the operational tracks, and was supported on reinforced concrete beams contiguous with each of the new piers and abutments.

A steel running plate was on top of the beams and by using Teflon bearing pads the bridge could be slid along, pulled by powerful 140tonne capacity hydraulic jacks at each pier and abutment.

The concrete beams were built to the ends of the new crossheads so that this rail could go on to them and carry the bridge into its final position.

Preparations concluded with a trial pull for the new deck a few weeks before the occupation, and the second operation went exceptionally well.

The bridge was in place with its track, the links to the main track either side were installed and tamped down and new power lines were installed to replace the old. Signalling was reconnected and trains were rolling through for the Monday morning rush hour.

Meanwhile underneath, the excavation of the highway cutting could be completed to full depth and the road section could join the rest of the highway construction.

No 40  
EastLink's Operations Centre sits strategically above the Ringwood bypass turnout just before the northbound road passes into the tunnel underneath the pristine Mullum Mullum Valley





THE DECISION  
TO SET UP A DEDICATED  
FABRICATION  
OR PRECAST YARD  
WAS A WINNER,  
IN MORE WAYS THAN ONE

# PRECAST YARD'S FLEXIBILITY

A decision to set up its own precast fabrication yard was one of the best moves the contractor TJH made on the whole project, helping it bring the contract in five months early.

It gave the construction team flexibility in both the design and logistical planning of the huge project, which involved the largest bridge building exercise in Victoria's history. It also ensured tight quality control of the major structural elements on the road from bridges through to the assorted noise reflectors and fascia panels of the retaining walls.

The precast facility also spread some of the economic benefits of the project to a region of Victoria away from Melbourne that needed an economic push.

During just over two years of operations the yard had to produce vast quantities, nearly 23,000 pieces in all, of a wide variety from bridge beams and parapets panels to assorted noise wall panels, retaining wall fascia units and even bridge pier sections.

"Once it got going it was the largest precast yard in Australia," says Don Johnson, the contractor's operations manager for the overall project.

An old steel fabrication yard at Morwell, a town about 150km from Melbourne,

was chosen for the precast yard, offering spaces for laydown areas and covered production facilities as well as some outdoor casting beds.

A workforce of some 200-plus, and around 40 staff, was drawn from a population "which had past engineering construction skills and a willingness to learn new ones," says Lee Price, TJH construction services manager.

A specially-erected concrete batching plant was manufactured by a local supplier specifically for the works, eventually turning out 450 separate items a week.

The most important part of the precast operation was the 1,650 bridge beams for the 88 separate bridges making up the 17 major crossings and interchanges on the road. Most were the Super Tee beams, a V-shaped trough with a flat base and flat projections at the top. This design had been developed in Victoria, and is now widely used in Australia because of its versatility. It can be produced in various depths and for different spans.

TJH's John Dauth says that the unit is particularly convenient. When placed side by side the units immediately form a flat deck surface that can be used as a base for casting the deck and for walking on.

The design team took full advantage of the precast facility, which allowed them to move to a maximum beam span length of 1,800mm.

The precast yard also manufactured very heavy 200tonne sections made for bridge piers, an unusual use of precasting, but one which saved further time at site, says Dauth. This would particularly save time on the central reservations of live roads where work on site would have demanded weeks or even months of traffic control measures and constrained access.

The yard also turned out the moulded panels for the noise walls (which required a variety of specially coloured concretes to be developed) and much larger cantilevered panels with textured finishes and coloured fascias for the soil nail retaining walls.

All the units had to be delivered mainly at night on State roads, which was a major planning exercise in itself. Bigger loads needed escorts and could only travel at restricted times.

Price says that VicRoads, the State Government road agency, was extremely helpful with permits and routing for the more than 100km-plus distance.



No 41  
The use of precast for much of the construction ensured both speed and quality of the work





THE TOLL SYSTEM ON EASTLINK WORKS WITH OTHER ROADS, AND OFFERS USERS A VARIETY OF WAYS TO PAY

# 'PROVEN TECHNOLOGY' AT LAUNCH

The tolling system chosen for EastLink is called a multi-lane free-flow Electronic Toll Collection (ETC) system, which means that vehicles do not have to stop to pay.

Interoperability, or interaction, with other Australian toll systems was important for a seamless customer experience and mandated by Australian Standards. EastLink uses an electronic tag system – “Breeze” – based on the European DSRC standard. It is, for example, interchangeable with another DSRC tag system (e-TAG) already in use on the nearby CityLink. Dedicated Short-Range Communications (DSRC) are one-way or two-way short to medium range wireless communication channels specifically designed for automotive use and a corresponding set of protocols and standards. It offers communication between the vehicle and roadside equipment.

Peter Bentley, ConnectEast’s chief operating officer, was involved in the project’s bid phase and has been responsible for overseeing the delivery of the tolling system and planning its future operations.

He says that an agreement between toll road operators ensures that electronic tags will be interoperable throughout Australia.

He explains: “This means, in effect, that if you have a CityLink tag, it will work on EastLink and vice versa, and the tolls will appear on a single statement.

“We do not want motorists needing to open more than one account or install two or more tags to use any of the tollroads now in use.”

The same applies for video account holders (accounts based on licence plate numbers – LPN) who can drive on both tollways, without needing to open a second account (although different fees apply).

EastLink’s tolling system means customers have a choice of three identification and payment methods: via the Breeze tag; via the video-based tolling or they can elect to pay on a casual-use basis, buying vouchers for road use as and when they need them.

The tag tolling system meets European standards and was supplied by the Spanish company SICE. It employs roadside equipment and tags supplied by Austrian-company Kapsch TraffiCom.

Along its 39km length EastLink has 13 tolling points each with two gantries.

Other sites around the world use similar systems from Kapsch (including Sydney’s Westlink M7), and this means the roadside system was considered “proven technology” when commissioned.

The roadside computer system equipment for the EastLink toll system is deployed in technical shelters and on gantries. Sensors are housed on the gantries that cover discrete tollway sections uniquely defined by the road technology, while the technical shelters hold the various control units which synchronise the gantry sensors and process and store the vital data on vehicles from them.

The roadside/gantry system, which comprises sophisticated equipment, is responsible

for the collection of the data which is required to calculate the fee for using the road, and for enforcement purposes.

The actual calculation of the tolls and all the customer service and billing functions are provided by a separate central tolling system. Vehicles entering a gantry’s ‘detection and tracking zone’ are monitored and are classified as a motorcycle, car or light or heavy commercial vehicle.

When a vehicle tag is activated a series of checks are rapidly carried out, and as part of the tolling procedure at each gantry, images of a vehicle and both its front and rear licence plates are captured. The system is able to automatically read the vehicle’s licence plate number from these images.

Images generated by the tolling system are only held for a very short period of time. The exception is where enforcement action is deemed necessary, when a road user has not made an arrangement to pay the tolls.

The specification for the EastLink tolling system included the ability to handle 4.5 million vehicle passages under gantries (transactions) per day.

During the toll-free testing period, prior to going live, an average of 277,000 trips per day were handled: the peak number of transactions in a given 24-hour period was over one million.

42



43



44

No 42, 43, 44 State of the art electronic tolling was developed specially for the project



# ROAD CONTROL AND OPERATIONS

As the Concessionaire of the EastLink project, ConnectEast engaged Transfield Services under a five-year, optionally renewable contract for the road's operation and maintenance. In Australia, Transfield Services holds a number regional road maintenance contracts, together with contracts for the operation and maintenance of Sydney's Lane Cove Tunnel and Melbourne's CityLink - both major tollways. The company is also involved in operation and maintenance of the Sydney Harbour Tunnel.

Glenn Birthisel, Transfield Services' contract manager for EastLink, was involved with Melbourne's CityLink tollway for about eight years before switching over to EastLink as the ConnectEast consortium was preparing its bid.

"Transfield's role is to operate and maintain the finished product, but it was vitally important that we were involved in this project through the design phase as well," says Birthisel. "We needed to look at whole of life issues, consider what impact the design might have on road operation and future maintainability, and ensure that any issues were resolved as early as possible during the design."

Transfield Services now has about 70 staff employed full time on EastLink, the vast majority of whom are in the field working on the maintenance of signage, vegetation, drains and road pavements, together with all the mechanical and electrical equipment including lighting, power supplies, fire detection and suppression equipment, toll gantries and associated tolling equipment.

Monitoring of water quality in the many wetlands is also one of Transfield's responsibilities.

## Control Room

Transfield's monitoring and management of EastLink traffic is conducted from the EastLink Operations Centre (ELOC) in Ringwood, overlooking the road and just south of the tunnels.

According to Birthisel, the control room is very similar to those built for other road projects around the world, but it includes the very latest evolutions in traffic management technology.

Operators are stationed at two main consoles 24-hours-a-day. The consoles are identical in layout and function, and the whole EastLink operation can be monitored from either one. Facing the control room operators is a 2 metre x 4 metre rear projection screen that provides information on the status of tunnel and traffic management devices, including what is currently displayed on the multitude of message signs. On an array of smaller screens, as alerts within the various traffic monitoring systems are triggered, real-time images are displayed from 24 of almost 150 CCTV cameras along the route.

## Tunnel Monitoring

In the tunnels, pan/tilt cameras are located every 120 metres, and fixed position, high-tech incident detection cameras every 60 metres and at the tunnel portals. Data from the detection cameras undergoes image analysis to check what changes have occurred in the patterns of pixels since the previous analysis. Pattern changes consistent with a vehicle travelling normally are ignored. However, a pattern consistent with a stationary vehicle or a pedestrian, a pattern moving backwards or a pattern change indicating that debris has appeared on the road, for example, will all trigger a traffic alert.

All pan/tilt cameras operate continuously, but can be manipulated automatically should the system raise an alert to the traffic control room operators. If a tunnel cross passage door is opened, for example, an alert is raised, and cameras in the tunnel and its cross passages are switched to the video wall where they pan to show vision of the relevant door. Other cameras are programmed to swing to specific angles, depending on what has activated them. Console operators have manual control over every pan/tilt camera.

## Tunnel Ventilation

In the design of the tunnels on EastLink there was a requirement for vehicle emissions to be discharged through the ventilation stacks located near each tunnel's exit and not through the tunnel portals. The systems used to achieve this goal are complex. In each tunnel, sensors constantly monitor air speeds, visibility and the levels of carbon monoxide and nitrous oxide. Twelve jet fans in each tunnel move the air towards the ventilation stacks at rates dependent on both the sensor data and air flow conditions inside the tunnels. In conditions of high traffic volumes, or if several large trucks pass through a tunnel together, there can be a tendency for the traffic to force air ahead of itself towards a portal. In this instance the jet fans reduce the air flow so fans in the ventilation stacks can extract the air effectively, before it reaches the portal. In conditions of light traffic, the jet fans may need to operate in the opposite direction to ensure there is sufficient air flow to keep air quality in the tunnels within specifications. Each ventilation stack contains five large exhaust fans. A maximum of four can be in service at one time with the fifth as a standby. The time of day and traffic volumes expected determine the number of exhaust fans that operate at any one time.

Transfield manages the tunnel ventilation from the control room.

## Tunnel Safety

Tunnel safety has been given highest priority. In the event of an accident:

- incident detection cameras would provide the control centre with the first alarm;
- heat sensors running off fibre optic systems and zoned to 30 metre intervals along the length of each tunnel would detect any change in temperature and automatically alert the control centre if there was a fire;
- the traffic control room operator could manually activate the water deluge system if deemed necessary. [The system can supply full capacity deluge over a road length of 60 metres while supplying sufficient water for the operation of two fire brigade hoses from hydrants nearby.]
- the tunnel's jet and exhaust fans would be used for smoke management; and
- advice would be disseminated to motorists via tunnel message signs, public address systems and/or messages transmitted through a radio rebroadcast system and onto vehicles' AM and FM radios

Every 120 metres the tunnels are linked with a cross passage which would provide motorists with access to the other tunnel in the case of emergency. In case of breakdown, help phones are located at, and opposite, every cross passage in both tunnels. Mobile phone coverage is also provided inside the tunnels.

## Maximum Vehicle Height

According to Birthisel, many builders of road tunnels around the world could learn from the innovations introduced on EastLink to stop overheight vehicles entering the tunnels.

The maximum allowable vehicle height for an EastLink tunnel is 4.65 metres, the same maximum that applies to Melbourne's CityLink tunnels.

On EastLink, infrared beams monitor the height of vehicles as they approach the tunnels from each end. The primary

height detection system activates warning signs before the last available exit, so the driver has an opportunity to divert away from the tunnels. A secondary system will activate boom gates to prevent the offending vehicle from entering the tunnel. The technology takes into consideration the nature of the interruption to the beam so false alarms are eliminated.

If the beam detects an overheight vehicle that has passed the last exit opportunity, a variable message sign (VMS) instructs that vehicle to stop and all vehicles in the vicinity are slowed down via the variable speed limit system. If the offending vehicle doesn't stop, an automatic closure of boom gates will occur. The traffic control room operator can abort this automatic closure if required.

Transfield Services dispatches one of its incident management vehicles immediately. In a well structured and well rehearsed procedure, one man on-site assisted by the traffic control room operator can safely sort out the traffic, send the offending vehicle around onto the opposite carriageway to return from whence it came and have the road fully open again within ten minutes of the closure.

The booms at each end can also be lowered if an incident occurs inside the tunnels, to prevent any potential harm to approaching motorists.

Birthisel said that by having one entity look after both traffic management from the control room and incident response they have managed to achieve an extremely well integrated incident management solution.

## Road Signage And Its Control

There are more than 180 Variable Message Signs (VMS) along EastLink, and Birthisel said that Transfield's early work in developing more than 240 traffic management plans was crucial to the final layout of the signage network.

EastLink also has ramp control signs, freeway condition signs, trip information signs, lane use signs, variable speed limit signs and the signs on approach roads.

To ensure that operations on EastLink are integrated into the connecting road systems, its traffic control room operators coordinate their work with that of operators in the VicRoads Traffic Management Centre as required.

EastLink's electronic signage and control devices have been designed to work singularly or in combination, meaning multiple devices can be activated in response to one command.

Closing a lane in a tunnel, for example, requires the activation of many lane use signs, tunnel message signs, the radio rebroadcast system, VMSs and variable speed limit signs. All this can be achieved from a single or a very limited number of commands.

Automated messages can be over-ridden, a variety of responses to situations are selectable from menus, and if required the traffic control room operator can create a new message to suit the situation.

## Traffic Flow Monitoring

Pairs of pavement loop detectors installed in each lane at approximately 500 metre intervals are used to monitor traffic volumes and the classes of vehicle using EastLink. This data allows the prediction of the travel times to exit points further along EastLink and the Eastern Freeway. These times are recalculated every 20 seconds and the 12 trip information signs are updated accordingly.

## Weighing In Motion

Between Cheltenham Road and the Princes Highway, facilities have been installed in the road to measure and record the weight of each axle of each vehicle. It is anticipated that data from the weighing will lead to a better understanding of freight movements and the loads being carried around Melbourne. The data will also be used in later analysis of the pavement's performance.



# A MAJOR ABORIGINAL SITE

## THE ROAD SITE THREW UP SOME INTERESTING FINDS THAT HAD TO BE INVESTIGATED EVEN IF IT MEANT EXTRA WORK

One of the more curious aspects of the EastLink landscaping is a mound of earth towards the southern end of the project near the Dandenong Bypass.

It contains the remnants of a major archaeological find, possibly one of the more important made on the Australian mainland. It is comparable with finds made in Tasmania, according to John McKechnie, who oversaw archaeological liaison work for contractor TJH.

Like on a dozen other aboriginal sites found on the road corridor, or already known to exist, visual inspection, digging and excavation of trenches was required.

But whereas other sites needed weeks or a few months, here a team of 20 investigators spent over two years on the project, to carefully investigate and sift the ground for artefacts and remains. A team of archaeological workers from the La Trobe University carefully dug along the road line to piece together a picture of aboriginal life going back 30,000 years, and with particularly significant relics from around 3,000-6,000 years ago.

“Most of these were stone fragments, chips from the making of stone tools, and some tools themselves such as hammer stones and Bondi spearheads,” says McKechnie. “More organic remains did not survive at this point. It seems to have been swampy ground and with such an acidic character, bones and such material were dissolved.”

Despite that, the material on the site was of great importance and drew the attention of Dr Jim Allan, a foremost figure in aboriginal studies, who has done two reports. Studies on the materials sifted out of the ground and removed from the site will continue for years.

“A lot of resources and time were put into the investigation,” says McKechnie.

The site had to be investigated because about one-third of it lay directly on the road alignment and just at a point where the ground rises above the surroundings, which meant it had to be removed for a cutting. The remaining two-thirds of the site are intact.

The high ground was the reason for the presence of the remains in the first place. It seems migrating tribes stopped here seasonally, choosing the higher ground above surrounding swampland to camp on.

To give excavators time for the investigation, a special chicane had to be created around the site, allowing the big heavy haulage trucks to pass around the works on the way to dumping points.

All this caused some frustration and fears for the project schedule, says McKechnie. But the work had to be done, and archaeological requirements in the last resort can stop a project completely. As it happens the site was considered well investigated after two years, and was released with the sifted material to be kept on one side.

Other investigations along the site were also carried out including some of 19th century settlements, like an old coaching inn. But none have had the significance of the Dandenong site.





# LESSONS LEARNED FROM EASTLINK

Following the opening of EastLink, a workshop for the various parties involved in the project's delivery was convened to review the key successes of the project and to analyse what could have been done a little differently.

Geoff Rayner, SEITA's general manager engineering, looks at some of the lessons learned from earlier projects that influenced the Government's approach to EastLink and the lessons learned from EastLink that will be carried forward.

"The establishment of SEITA as a single purpose government authority to oversee EastLink worked exceptionally well. It ensured that nothing would cause distraction

from the project and gave us good access to government decision makers: senior people who could get answers and make decisions quickly. The parties we worked with appreciated that and responded very strongly. We had learned the benefits of a single purpose authority previously, but EastLink certainly reinforced the value of this approach.

One of the most important factors behind EastLink's success was how well all the project relationships worked. Positive relationships don't just happen, so we very deliberately set about building and fostering them. It helped that so many of the key people in each organisation had known each other in civil engineering business over a long time, helping to create an element of trust.

Relationships were also fostered from the top, with the SEITA and ConnectEast boards participating in joint project inspections to further build relations. The dedicated focus on Corporate Governance for all project parties was exceptional, and this single focus at board level provided an avenue for value adding and is another key benefit of the public private partnership model.

The role of the Independent Reviewer in reviewing design and delivery of the project by "general overview and reasonable checking" also worked exceptionally well, providing both the State and ConnectEast with an independent assessment of design compliance and construction progress and quality and readiness for operation.

The proactive development of the urban design and commitment of all parties to achieving an outstanding outcome is demonstrated in the final result. Perhaps less visible but no less important, the value of communicating with the public has also been highlighted. We made a point of getting as much information into the community as possible, emphasising all the benefits of the project: the way it would better link communities; the savings in travel time and fuel; the road's aesthetics; the attention to noise abatement; the extent of remediation of creeks; and all the new wetlands to be created. Then we made sure the community was updated with construction progress all the way through.

Of course, much of the project success and speed of delivery must be attributed to past Governments who were forward thinking enough in the 1960s to set aside the land required to build EastLink. As a result, community acceptance of the project was much greater.

As with all projects of its type, lessons have been learned for incorporation into future projects. These include streamlining the design approvals process, undertaking innovative methods for recruiting human resources and construction materials and continuing to make advances in design and construction methods and technologies. Having set a new benchmark with the delivery of EastLink, future projects to be delivered in Melbourne can only benefit from its achievements and lessons.



## 'Ellipsoidal Freeway Sculpture' by James Angus

"SHAPES WILL APPEAR TO EXPAND AND CONTRACT..."

**Description:**

Painted fibreglass on a steel framework, a chain of 24 modular ellipsoids parallel to the roadway, varying in shape and ranging in diameter from one to three metres.

**Location:**

Adjacent to the northbound carriageway between Wellington Road and Corhanwarrabul Creek.

**The artist said:**

"My intention is to create a sculpture that is genuinely three-dimensional and maximises the effect of various viewing positions. Shapes will appear to expand and contract...[and]...are intended to form a series of lenses for viewing the surrounding landscape."



## 'Public Art Strategy' by Emily Floyd

"A STORY ABOUT PLACE AND IDENTITY."

**Description:**

Fabricated steel, 19 metres long, 13 metres high and 7.5 metres wide at the wing span.

**Location:**

Adjacent to the southbound carriageway between Cheltenham Road and Dandenong Bypass.

**The artist said:**

"The sculpture depicts a giant blackbird ominously contemplating an object, part worm-part generic modernist sculpture."





# AND TO SUM UP...

The art of road building has been taken “to a new level” with opening of the EastLink tollway in Melbourne, Australia.

The finished product offers users not just a major enhancement in transport provision, but state-of-the-art technology for ease of use combined with unprecedented attention to the aesthetics and appearance.

On this road there is also art in the road building. Design and form are not just reflections of engineering needs for cuttings, embankments and barriers but a carefully integrated architecture to give it coherence, interest and balance. Landscaping enhances architectural forms.

There is even art on the roadway: four giant modern sculptures for the motor travellers and eight smaller works on the EastLink Trail (an excellent walking and cycling path alongside).

Provision of the Trail, behind extensive sound barriers, across natural bushland and around reconditioned creeks, waterways and ponds, reflects sensitivity in the design to environment and community needs.

EastLink also demonstrates how the right approach to design and commissioning of the road can give users benefits and extras.

“Using public-private partnership methods, carefully controlled, means you can turn

projects into something beyond the norm,” says Ken Mathers, CEO of SEITA, the State body which commissioned and saw through the project.

SEITA developed a refined and sophisticated high-level performance specification to give bid competitors full rein for innovation, stimulating state-of-the-art offers for tolling technology, value for money tolls and an integrated architecture.

An exhaustive bid, built on past experience to keep the rivals locked in to competition, resulted in various “extras” for the road within the bid costs.

The “extras” included the Trail: additional and significant lengths of major road for toll-free bypasses for two urban centres, with junctions into the main EastLink; enhancement for local railway stations, and community provision of parkland and facilities around the wetland areas.

A refined inspection system was used to monitor construction, based around the advanced concept of an Independent Reviewer, to ensure everything was delivered as bid.

Construction itself broke records, at A\$2.5 billion for construction, the largest project in Australia. On six occasions, design-build contractor Thiess John Holland, a joint venture, carried out

an unprecedented A\$100 million turnover per month on a project acknowledged as one of the safest and most environmentally conscious in the country.

The road also shows how a project can win over the community.

Few community relations teams face challenges like those on EastLink, which would not only turn a quiet transport reserve into a busy road corridor, but which also started off in an issues rich environment.

Initial community concern has now become enthusiasm, not only as the quality of the road has become apparent, but because of intensive community relations efforts by the Government client SEITA; the Concessionaire ConnectEast and the contractor TJH. ConnectEast has also worked hard to integrate with the community.

In all aspects, by opening day the road had achieved a success that was internationally significant, believes ConnectEast managing director John Gardiner.

As Ken Mathers declares: “We believe EastLink could have set a new worldwide benchmark for road building.”





