

# URS

at work around

issue ten • 2010/2011

# Asia Pacific

**Chris Dann**

Engineers Australia's  
Sir John Holland  
Civil Engineer of the Year



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welcome

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Welcome to the 2010/2011 edition of *At work around Asia Pacific*.

*At work around Asia Pacific* showcases the scope of projects URS is involved with around the region, from the largest road project in AusAID's history in Indonesia to New Zealand's next generation of kindergartens with the 'green kindergarten'.



In the Asia Pacific region URS has achieved some major successes and milestones in 2010, some of which you will read about in this edition. We have enjoyed the success of sharing many award wins with our clients across a range of sectors. In particular we are proud of our colleague Chris Dann being recognised amongst his industry peers for his technical excellence and contribution to the engineering profession in Australia.



In recent times, we have welcomed local colleagues from Scott Wilson to URS through a global acquisition of the Scott Wilson Group by URS Corporation. We believe this will benefit clients through the expanded capabilities that can be offered—former Scott Wilson clients will have access to a much wider range of multi-disciplinary services and URS clients will have seamless access to specialist rail, ports and mine infrastructure expertise.

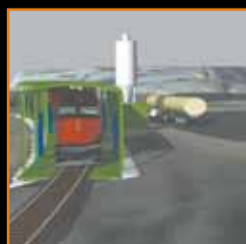


We can continue into 2011 optimistic that in our region the outlook is positive and we see many opportunities for exciting and challenging work.



I hope you enjoy reading this edition and I look forward to receiving your comments.

**David Williamson**  
Managing Director, Asia Pacific



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## Scott Wilson is now a part of URS



Trackbed investigations for maximising asset life, BHP Billiton Iron Ore, Western Australia.



Port Botany Expansion Project, New South Wales.



Automatic Train Operation Project, Rio Tinto Iron Ore, Western Australia.

# We are pleased to announce the Scott Wilson Group, a leading global infrastructure design and engineering firm, is now a part of URS Corporation.

Together, we have approximately 46,500 talented professionals in a network of offices across more than 40 countries—including a major presence in Australia, New Zealand, China, India, Europe, the Middle East and the Americas.

“The acquisition of Scott Wilson opens the door to numerous new opportunities for URS in major international infrastructure markets,” said Martin M. Koffel, Chairman and Chief Executive Officer of URS.

“We have expanded our capabilities in key geographies, such as China and India, two of the fastest growing economies in the world. With Scott Wilson’s technical depth and talented team of professionals around the globe, URS is well positioned to support public and private sector clients worldwide on their largest and most complex infrastructure assignments.”

In Australia, Scott Wilson now operating as URS/Scott Wilson, is known for its innovative projects in the transportation and maritime sectors. The rail sector covers a multi-disciplinary offering in light rail, metro, freight and heavy haul operations. Services provided range from operational, technical and business consultancy to detailed design and construction supervision.

Systemwide Pty Ltd, which was acquired by the former Scott Wilson Group in July 2010, is also now a part of URS. Systemwide is a specialist consultancy based in Melbourne that provides modelling, rail capacity and network performance advice needed for both strategic and day-to-day operational planning. The combination of Systemwide’s operational and analytical assessments together with URS/Scott Wilson’s engineering and transport planning expertise, provides a complete solution for clients.

### Selected URS/Scott Wilson projects

#### Mount Newman Railroad Total Route Evaluation

BHP Billiton Iron Ore is undertaking a project to expand the Mount Newman Railroad with the intention of increasing the output of iron ore through Port Hedland.

URS/Scott Wilson’s Trackbed Technology team was initially appointed to undertake a ground probing radar (GPR) survey

to assess the condition of an existing section of track (280km) between Port Hedland and Yandi Junction. The main focus of this work was to advise on the suitability of using Ballast Cleaning as a method of renewal.

The client also required advice regarding renewal prioritisation and the optimum source of aggregates to be used going forward.

The GPR survey was increased to include the majority of the Mount Newman Railroad network (650km) and was used as a route based method of assessing trackbed condition. Detailed intrusive investigations were also performed at discrete locations, with a range of materials tests carried out to assess the degradation and performance of new and in-service materials.

The work undertaken has allowed BHP Billiton Iron Ore to better understand the current asset condition and understand the longer term implications of ballast cleaning on a site and strategic level.

In addition, advice is now being provided in relation to the overall maintenance and renewal strategy used throughout the system. This will ultimately enable optimised use of track access that is available for engineering works and maximum value from the works in terms of whole life costs.

#### Port Botany Expansion Project

URS/Scott Wilson was part of the successful Design and Build team that won the bid for the AU\$1 billion Port Botany Expansion Project. URS/Scott Wilson’s primary responsibility is the design of the marine structures, comprising the 1.8km long main berth, terminal tug berth and associated navigational aids.

The project involves 70ha of land reclamation adjacent to the existing Brotherson Dock within Botany Bay and facing Sydney’s Kingsford Smith International Airport, and 150ha of dredged areas for channels, basins and enhancement works to the Penryhn Estuary and foreshore areas. Port Botany is the commercial seaport that serves New South Wales, Australia.

The berth structures comprise precast concrete counterfort units placed on a backfilled dredged trench. Total retained

height is in excess of 20m, a first for URS/Scott Wilson. The final fit-out of the terminal, involving associated infrastructure, pavements, container cranes and other equipment will be completed under a follow-on contract managed by the successful stevedoring bidder.

#### Automatic Train Operation Project

URS/Scott Wilson acted as safety advisor for the Automatic Train Operation (ATO) Project, a driverless rail operation to be introduced on the largest privately owned rail network in the world. URS/Scott Wilson provided advice to Rio Tinto Iron Ore in relation to the suitability of standards and the submission of the safety case to the Office of Rail Safety (ORS).

Rio Tinto operates the rail network in Western Australia which consists of approximately 1,200km of standard gauge (1,435mm) track. The network has continued to be expanded with a new spur line to service a new mine at Hope Downs. ATO will replace the driver functions for driving the train while managing in-train forces and interfacing to the locomotive—for example operating horn, headlights and bell, with autonomous on-board capabilities. Other driver functions including monitoring, diagnosing faults and performing tests will be conducted by a remote operator in a control centre in Perth, some 1,500km away. Additional functions, such as monitoring level crossings, are an essential part of the ATO system.

URS/Scott Wilson’s role was to act as safety advisor for the ATO trial system with respect to operational safety, the submission to the ORS, and advice and guidance with regards to the safety cases required for both system and software aspects of the project. We provided engineering safety management support, assistance with the ORS submissions, reviewed safety deliverables, audited development processes and provided software safety guidance and safety case development advice.



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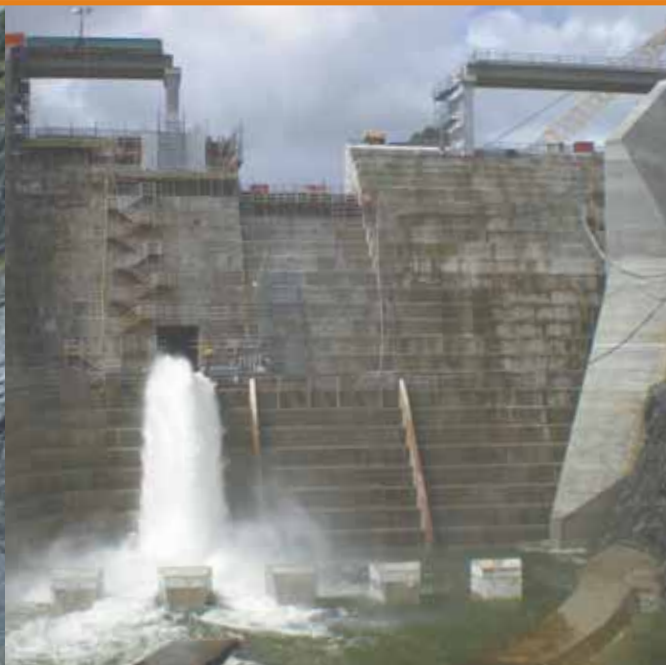
# Awards

## Chris Dann

### Engineers Australia's Sir John Holland Civil Engineer of the Year



Hinze Dam, Queensland Australia. January 2009.



Hinze Dam after recent rain, October 2010.



Cosseys Dam, New Zealand.

Chris Dann's contribution to civil engineering across Australia and internationally was officially recognised when Chris was announced as the Sir John Holland Civil Engineer of the Year for 2009.

Chris has over 25 years civil and geotechnical engineering experience with projects across Australia, South East Asia and Europe.

Chris has been involved in a broad range of major development and infrastructure projects from both a design and construction aspect. Projects in his early career included the Brisbane and Adelaide Myer Centres, Sanctuary Cove Development, Southbank Parklands, Treasury Casino Project and Roe Street Railway Tunnel in Perth.

Chris has worked across a range of international locations including Germany, the United Kingdom and South East Asia. He was based in Kuala Lumpur for several years working on a range of major projects including the design and construction of a major slope stabilisation project.

Upon his return to Brisbane Chris worked closely with the URS Dams Team in Asia Pacific on the Lake Eppalock and Yarrowonga Weir Upgrade projects in Victoria and the Cosseys Dam Upgrade in New Zealand. Chris has also worked extensively across the mining industry on a range of heavy civil projects including mine waste management facilities and water infrastructure.

Chris is currently a Senior Principal with URS in Brisbane and the Design Manager for the AU\$350 million Hinze Dam Stage 3 Project on the Gold Coast.

As part of Engineers Australia's Eminent Speaker Series Chris has been touring the country this year delivering his presentation, 'Hinze Dam Stage 3—Value Delivered Through Innovation'.

#### The Interview

##### Why engineering?

From an early age I always enjoyed working out how things were put together so I suppose it was no surprise that I ended up in the engineering industry.

##### Who has been your most influential career mentor?

I have been fortunate to have had a number of great mentors in my career starting with Nev Morrison and Denholm Brown at Soil Surveys in the mid 1980s. In fact I joined Woodward Clyde (URS predecessor company) in the mid 1990s to work with Denholm Brown, leaving the construction world to take up consulting again. I have also enjoyed working with Dick Davidson (URS – Denver) and Sal Todaro (URS – Denver) in the dams business. They have introduced me to a wealth of project experience and technical experts who provide great support to our teams.

##### What is your greatest career achievement?

There have been many projects that I look back on and I think 'wow—that was a great achievement'. However the Sir John Holland Civil Engineer of the Year award is my greatest achievement, particularly as it was so unexpected.

##### How did it feel when you were announced as the Sir John Holland Civil Engineer of the Year?

Absolutely staggered—I didn't realise I had been nominated.

##### Where do you see yourself professionally in 10 years?

I hope I will still be working on major projects and see the younger guys we have now taking on leadership roles on our future projects. Hopefully they will still want me in the team.

##### What single piece of advice would you give to the next generation of engineers?

Make sure you involve your review team in the project as early as possible.

##### What do you consider to be the most impressive piece of infrastructure in the modern built environment, why?

That's a tough question. I like all of the large infrastructure projects shown on the Discovery Channel—Hoover Dam, Panama Canal and the Golden Gate Bridge. The vision these teams had to deliver on such a large scale is truly impressive.

##### Which project has given you the most professional satisfaction?

I'd have to say the Hinze Dam Stage 3 Project. It's been fantastic to have been involved with the leadership team from the bid phase through to design and construction. I have also enjoyed seeing members of the team develop their skills during the various phases of the project.

##### How was your career steered towards water and dams?

I had been involved in a number of dam projects in my early time at Woodward Clyde and when I returned to Brisbane from Malaysia I was asked to help Dick Davidson on the Lake Eppalock project in the late 1990s. I enjoyed working with Dick with his wealth of dams experience and the business really developed in Australia after this project.

##### What do you see as the greatest challenge facing the mining industry today with respect to tailings?

Regulatory compliance and the risk of higher standards required for compliance.

##### What approach do you think governments should take towards water security for the future?

I believe investment in infrastructure, as a general comment, has not kept up with population growth. This lack of investment leaves us vulnerable to stresses on our water system as we have seen through recent droughts.



For further information please contact  
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L-R: Barry Tonkin, Chairman Civil Board of Engineers Australia; Chris Dann, URS and Glen Palin, Group Managing Director of the John Holland Group.



Lake Eppalock, Victoria Australia.

## URS receives two prestigious INGENIUM Excellence Awards

## Key member of URS-led Resettlement Implementation Team receives recognition award



L-R: Vitor Domingues (Fulton Hogan), Mark Johnson (NZTA), Tony Dickens (Fulton Hogan), Laurie MacDonald (Opus), Mike Howat (Fulton Hogan), Sumi Eratne (NZTA), Ray McIndoe (INGENIUM), Mark Drury (URS), Peter Matthewson (Opus), Graham Chapman (URS).

Two URS projects were recently recognised at New Zealand's 6th annual INGENIUM Excellence Awards. Traditionally, there is only one award for each category, however due to the excellence of projects entered two awards were given in the Physical Works Projects over NZ\$2 million category and both were awarded to URS.

The State Highway 20 (SH20) Mt Roskill Extension Project won with the innovative Pauanui Wastewater Disposal to Irrigation Project receiving a specially created Highly Commended Award.

Forming a key part of the Western Ring Route, the SH20 Mt Roskill Extension Project is a NZ\$201 million, 4km motorway extension designed to ease congestion on SH1 and local roads in the Mt Roskill and Avondale areas. The extension includes two interchanges, four bridges, two pedestrian/cycle bridges, a dedicated cycleway and provision for two bus shoulder lanes in the future.

Commissioned in 2009, the state-of-the-art Pauanui Wastewater Disposal to Irrigation Project disperses high quality treated effluent through an innovative subsurface drip irrigation system, feeding the local park, air strip, new town gardens and golf courses in a water constrained summer resort area. Several of the cutting edge concepts—such as the irrigation of an active airstrip, use of sophisticated irrigation pigging (system cleaning) and the unique intuitive control system which solves complex criteria—represent significant advances for New Zealand.

Mark Drury, URS New Zealand's Chief Executive was among those who attended the award ceremony "I was very proud to be at the INGENIUM Excellence Awards dinner, along with Graham Chapman and Peter Gearing who accepted the

awards for SH20 Mt Roskill and Pauanui. While the two awards are specific to the two projects, they also reflect the skill, expertise, innovation and commitment that we put into all our projects."

### About the INGENIUM Excellence Awards

The INGENIUM Excellence Awards are for public infrastructure projects (where 'projects' is defined in the broadest sense). The awards are judged on economic, environmental, social, cultural, consultation and innovation levels.

INGENIUM is the brand name of the Association of Local Government Engineering New Zealand Incorporated. It represents all those who manage, maintain and operate public infrastructure in New Zealand. Public infrastructure includes roads & bridges, water supplies, sewerage schemes, stormwater systems, river control schemes, land drainage schemes, airports, and harbour facilities.

The focus of INGENIUM is on asset management and engineering for public infrastructure.



**For further information on the awards or projects please contact Graham Chapman, Transportation Sector Leader (SH20 Mt Roskill Extension).**  
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**Peter Gearing, Project Director (Pauanui Wastewater Disposal to Irrigation).**  
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L-R: Peter Gearing (URS), Ray McIndoe (INGENIUM), Robert Paterson (Client - Thames-Coromandel District Council), David Hooker (Contractor).



Award Winning Extension Section of the SH20 Mt Roskill Project.

John Hamilton, Social and Environmental Consultant, for the URS International Development Community Relations and Social Investment (CRSI) group, recently received a Recognition Award from Esso Highlands Ltd (a subsidiary of ExxonMobil).

The award acknowledged Mr Hamilton's successful leadership of the resettlement agreement negotiations in Papua New Guinea (PNG) for Exxon Mobil's PNG Liquefied Natural Gas (LNG) project.

URS International Development Manager, Steven Baker said Mr Hamilton is an integral part of the Resettlement Implementation Team in PNG.

"The award specifically recognised John's work negotiating the Hides Gas Conditioning Plant site Resettlement Agreement," Mr Baker said.

"The ground work undertaken by John and the URS team has allowed Esso Highlands Ltd to successfully engage, negotiate and complete resettlement agreements for the new international airstrip to be built at Komo station by EPC contractor, McConnell Dowell-CCC Group and the Hides Gas Conditioning Plant, which is being built by CBI Clough.

"This has included the coordination of specialists to provide recommendations for resettlement housing designs, reflecting local community needs and maintenance capacities, and the need to achieve cost and logistical efficiencies in the resettlement process. URS also coordinated a team of survey and census specialists from ANU Enterprises who developed and applied criteria to ensure that resettled communities are able to achieve sustainable livelihoods and household food security."

Since 2008 URS has been contracted by Esso Highlands Ltd to provide planning advice and implementation of community consultation activities and landowner and affected household negotiations for the ongoing resettlement program.

"The work being undertaken by the URS-led Resettlement Implementation Team is being conducted in accordance with the highest international leading practice standards for resettlement in order to secure the operational needs of the PNG LNG project, and to support the long-term interests of the resettled populations," he added.

The URS Resettlement Implementation Team includes staff members from URS Asia Pacific including Ed Ely, Ric Caven, Pat Vidler and Trevor Ole, supported by a large project management team in Adelaide and Port Moresby led by Dee Hartvigsen.

### About PNG LNG

PNG LNG is the largest resource project in PNG's history and when operating will double the GDP of PNG. The project will take gas from the Southern Highlands of PNG and transport it, via an onshore and offshore pipeline network, to a new LNG processing plant in the country's capital, Port Moresby. LNG will then be exported via ship to predominantly Asian markets.

The PNG LNG Project requires access to land for facilities and infrastructure across an extensive area. Where households are physically displaced or economically affected by the project, the URS team ensures such households are properly consulted and receive appropriate compensation and support in the resettlement of their homes and livelihoods.

There are 11 key sites across the Southern Highlands, Central and Gulf provinces. To date, URS's resettlement work has only been conducted in the Southern Highlands Province.



**For further information regarding the PNG LNG Project or the work of CRSI, contact Steven Baker, International Development Manager.** E: [steven\\_baker@urscorp.com](mailto:steven_baker@urscorp.com)

# Awards

## Tauranga Harbour Link wins Supreme Roothing New Zealand Excellence Award



The Tauranga Harbour Link Stage 2 Project was awarded the Supreme Award for a new road project at the 2010 Roothing Excellence Awards. The three-year undertaking to add a second harbour bridge linking Tauranga and Mt Maunganui was completed under budget and three months ahead of schedule.

It was the second part of the two stage project which was honoured winning the Greenstone Energy Excellence Award for a Major Road Project as well as the Roothing New Zealand Supreme Award. Stage 2 included the creation of a 468m long duplicate harbour bridge with a pedestrian and cycleway, 550m long four-lane flyover and associated ramps, a new duplicate aerodrome bridge of 80m with a pedestrian/cycleway and the widening and refurbishment of the existing harbour bridge. Being built in a heavily congested, environmentally sensitive area, it is the largest rooding project ever delivered in the Bay of Plenty.

URS was the Principal Consultant for the design and construction phases of Stage 2 carrying out the structural, civil and geometric design of the main alignment, ramps and local road connections on this section of the project. URS Chief Executive in New Zealand, Mark Drury said "This has been a significant project for us and in particular for all staff involved. Their hard work and dedication has yielded innovative techniques that are now being used across other projects after having provided an important contribution to the success of this project."

The judges said all of the entries in the Major Road Project category this year were 'all excellently executed projects'. The Harbour Link project stood out due to the attention to detail in its planning, the way in which risks were identified and managed and the precision of the operation.

Roothing New Zealand Chief Executive Chris Olsen said "The Roothing Excellence Awards aim to promote leadership, excellence and best practice in the provision of land transport infrastructure and this year's award entries all demonstrated the new levels of best practice and construction excellence which had been adopted by the industry".

"As the country emerges from a recession the rooding industry remains a hugely competitive environment. The quality of projects showcased by these awards is a strong indication that the sector is able to maintain extremely high standards."



For further information please contact **Dean Sykes, Principal Civil/Structural Engineer.** E: [dean\\_sykes@urscorp.com](mailto:dean_sykes@urscorp.com)

## Dr Kathleen Turner named Asia Literacy Ambassador



L-R: Jacqui Jury (Humanities Coordinator), Dr Kathleen Turner (URS), Barbara Burr (Project Coordinator) and Julie Barletta (Indonesian Teacher).

Dr Kathleen Turner has been selected as an official Asia Literacy Ambassador by the Australian Asia Education Foundation. Launched in March 2010, the landmark Asia Literacy Ambassador's program is designed to provide skilled professionals from the business sector with the opportunity to engage with schools, with the objective of building demand for Asia literacy among Australian secondary school students.

The program will pair up to 500 Australian corporate leaders from a range of sectors who have experience in Asia with secondary schools. The program builds on the Business Alliance for Asia Literacy, established in May 2009, with the support of 68 Australian corporations and peak bodies representing over 400,000 businesses.

Ambassadors volunteer their time to assist school communities to better understand the diverse career and life opportunities available to employees who are knowledgeable about Asia, who speak an Asian language and have the skills and dispositions needed to effectively engage with the people and cultures of Asia.

As an Ambassador, Dr Turner will be working with St. Aloysius College in Adelaide over the next six to eight months to expand on their existing Bridge to Indonesia project.

"Asia literacy is progressively more important in a global economy which is increasingly dominated by the Asian region and characterised by cross-country trade, commerce and communication," Dr Turner said.

"As a result Australia requires a skilled workforce able to work effectively with our Asian neighbours and service Asian-Australian communities domestically. This future workforce will be drawn from students currently in Australian schools. Apart from mentoring students and influencing their career aspirations, the program will also allow me to raise the profile of URS and the projects we are undertaking," she added.

Kathleen Turner is a Senior Social Scientist with the Community Relations and Social Investment group in URS International Development.



For further information please contact **Kathleen Turner, Senior Social Scientist.** E: [kathleen\\_turner@urscorp.com](mailto:kathleen_turner@urscorp.com)

## URS and Perth Festival win AbaF Partnering Award



URS is thrilled to announce it has won the Western Australian 2010 Australian Business Arts Foundation (AbaF) Partnering Award in conjunction with the Perth International Arts Festival.

Acting Regional Manager Darren Cunliffe said "This award recognises URS's and the Perth Festival's commitment to a mutually beneficial partnership, which provides tangible and intangible benefits to the Perth community, the arts and both partners. We are extremely pleased to see our commitment to the arts sector recognised by this prestigious award."

The partnership allows URS to apply its core environmental services to the arts and cultural sector through the development of a long term sustainability framework for the Perth Festival, creating future positive social, economic and environmental outcomes.

It also offers URS a unique platform to support key community activity in the heart of Perth that ultimately fosters stronger relationships with clients and employees.

Perth Festival General Manger Julian Donaldson said "This award recognises URS's contribution to the Perth Festival in developing a sustainability strategy which aims to produce real outcomes that will positively impact on the way the Festival operates."

The AbaF judges said "This is an excellent example of a strategic relationship that is thinking outside the box and embracing one of society's broader issues. It resonates with purposeful plans for a better future."

URS has been a major sponsor of the Perth International Arts Festival since 2009 and has committed its involvement for the 2011 festival.



Sam Walsh, Chapter Chair of AbaF presents Donna Pershke (URS) and Julian Donaldson (Perth Festival) with the AbaF Partnering Award.



For further information please contact **Donna Pershke, Senior Principal Sustainability.** E: [donna\\_pershke@urscorp.com](mailto:donna_pershke@urscorp.com)

## URS wins Australian Institute for Project Management Award in South Australia



URS has won the International Project Category of the Australian Institute of Project Management (South Australia) awards for the Eastern Indonesia National Roads Improvement Project. The project involved road design work in Indonesia. Peter Shea, Vice President Sustainable Development accepted the award on behalf of his URS team at the presentation ceremony. "There was strong collaboration of the team drawn from the Adelaide, Melbourne and Brisbane offices along with 15 key subcontractors," commented Mr Shea.

From 2006 to 2009, URS's International Development group was the contracted Project Preparation Consultant (PPC) for the Eastern Indonesia National Roads Improvement Project valued at AU\$20 million. Drawing upon key technical expertise from the Melbourne and Sydney offices, the PPC team partnered with the Indonesian Directorate General of Highways, and our client, the Australian Agency for International Development (AusAID), to identify and conduct feasibility studies of road and bridge sub-projects in Eastern Indonesia.

The 24 priority sub-projects were designed to final engineering detail and documented for tendering to World Bank standards. Tenders were subsequently called and have been progressively awarded. One year after the design project ended, more than half of the sub-projects are under construction, funded by a AU\$300 million Australian Government concessional loan. The award-winning submission will be judged for the prestigious National Award.

**For further information please contact Peter Shea, Vice President Sustainable Development. E: [peter\\_shea@urscorp.com](mailto:peter_shea@urscorp.com)**



Peter Shea, Vice President Sustainable Development, accepting the award on behalf of his team.

## URS ranks #2 in ENR's Top 500 Design Firms List

URS has once again earned a significant presence in the US based Engineering News-Record's (ENR) Top 500 Design Firms Sourcebook. For the past decade, URS has consistently ranked among the top three design firms overall. This year, URS ranks two, up from three last year. The Sourcebook, which is published each July, expands on the rankings listed in ENR's April 'Top 500 Design Firms' issue.

ENR performs an annual survey and ranks companies engaged in general contracting, specialty contracting, engineering, architecture, planning and studies. The rankings are based on annual revenue in the US and overseas, and are further divided into specific market categories.

### ENR—The Top 500 Design Firms

Ranked #2 Overall and ranked as one of the Top 3 Firms for more than a decade.

#### Among the top 20 in:

- #1 in Highways
- #1 in Bridges
- #2 in Transportation
- #2 in Airports
- #2 in General Building
- #2 in Dams & Reservoirs
- #3 in Manufacturing
- #4 in Power
- #6 in Industrial Process
- #8 in Petroleum

### ENR's Top 200 Environmental Firms

Ranked #3 Overall

#### Among the top 20 in:

- #2 in Environmental Management
- #2 in Air Pollution Control/Energy
- #4 in Construction/Remediation
- #5 in Nuclear Waste
- #6 in Hazardous Waste

### ENR—The Top 400 Contractors

Ranked #23 Overall

#### Among the top 20 in:

- #6 in Power
- #8 in Hazardous Waste
- #13 in Industrial Process/Petrochemical
- #14 in Contractors Working Abroad
- #19 in Domestic Heavy Contractors

### ENR's Top 100 Green Design Firms

Ranked #2 Overall

### ENR's Top 150 Global Design Firms

Ranked #3 Overall

### ENR—The Top 100 Design-Build

Ranked #12 Overall

#### Among the top 20 in:

- #3 in Combined Design & Construction Management
- #6 in Program Management
- #16 in Design-Build

## New Zealand's tsunami monitoring system in place



The impact of a tsunami on New Zealand's coastline is now better understood following the successful completion of a major project to install sea level monitoring equipment around New Zealand and on offshore islands.

Taking five years to complete, the Tsunami Network Project now forms an important component of a wider tsunami monitoring system for New Zealand and across the Pacific. The project was initiated following the devastating Boxing Day 2004 tsunami in the Indian Ocean, caused by a 9.3 magnitude earthquake off the coast of Sumatra, Indonesia.

A URS planning team obtained all planning consents and conservation permits for each site, many of which were located in areas of sensitive cultural or ecological significance. URS worked together with Land Information New Zealand and Geological and Nuclear Sciences, who were tasked by the New Zealand Government to install the network. As well as assessing the potential effects, several sites also required extensive collaboration and negotiation with Iwi and the Department of Conservation.

At a recent launch of the network, New Zealand's Infrastructure Minister Maurice Williamson praised the work of all groups including URS in getting the project completed on time and to budget. The Minister also noted in particular the successful partnership between government agencies and private companies such as URS to get the network up and running. Congratulations to Sarah Jenkin, Helen Anderson, Clowance Nolan and Sara Clarke of the URS Wellington Office on this outcome.

The sea level gauges are located at 19 sites. Gauges are located in the coastal marine area, below lowest astronomical tide and are connected to a telemetry system on shore via cabling. The telemetry system contains equipment to log sea level changes every second then transmits this data to a central operations centre in so doing providing a 'near real-time' monitoring network.



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**URS recently completed the remediation design and project management for what is considered to be the biggest remediation project of its kind in New Zealand's Canterbury region.**

## Mitigating the unknown—remediation of former WWII fuel bunker



Aerial of the remediation site.



Pit base soil sampling.

The Bankside Fuel Depot is a circular brick structure approximately 10m deep, constructed during WWII as a blast shelter for the 'secret' Te Pirita airfield's fuel store. Since the 1980s it has been variously used as a dumping ground, shooting range and local party spot. Labelled the most contaminated site in Canterbury, it reportedly housed large quantities of banned pesticides/herbicides, asbestos and potentially, unexploded ordnance.

One of the largest fuel bunkers built, the site recently received a Category II registration from the Historic Places Trust as the most intact example of New Zealand's five remaining WWII fuel tank protection bunkers.

### Mitigating the unknown

The overarching project objective was to ensure the removal of site waste and contaminated soils, to the extent that no unacceptable ongoing risk to human health and the environment remained, and to protect any future users of the site, such as the general public and maintenance workers.

With no detailed assessment of the waste materials, design of the remediation works was further complicated by the fact the fuel bunker offered a confined working space and as a heritage listed structure, required significant effort to avoid inadvertently damaging the fuel bunker and associated structures.

It was assumed all potential hazards were present. As such the contract provided for the handling of an extensive list of hazardous waste, developed through a visual site inspection using a man cage suspended from a crane, and knowledge of chemicals that were banned over the period the waste was dumped. The list included pesticides and herbicides (empty unwashed drums and partially full or full drums), miscellaneous chemicals, tyres, batteries, asbestos containing materials, general domestic wastes, contaminated soils and unexploded ordnance.

Building control and flexibility of the remediation works into the contract, as the nature of the hazards were progressively exposed and the range of unknowns closed out, mitigation measures and associated monitoring were able to be rationalised to match the conditions encountered.

### Protecting history

The URS team determined the only safe way to remove the waste from the pit was by crane and bucket as the combination of unknown chemicals and potential unexploded ordnance meant it was prohibitive to send clean up crews directly into the pit. URS structural engineers assessed the 60 year old brick structure to confirm the proposed use of a 30 tonne crane would not damage the structure, determining the minimum offset and maximum load for the crane and other machinery.

In addition trials using electromagnets were undertaken to assess if these could be used to lift full drums from the pit as this was determined to be the best solution to remove the steel chemical containers safely and intact. Consideration on the effects of a magnetic field on unexploded ordnances was also required with tests undertaken on explosive starter caps to confirm if the magnetic field would set off a charge.

### Ensuring air quality

URS designed and implemented an ambient air quality monitoring programme to comply with the air discharge consent and protect the health and safety of site personnel. Designed in collaboration with Environment Canterbury, the monitoring programme is one of the most advanced of its kind in New Zealand and has set the standard for similar remediation projects in the future.

Dust and VOC concentrations were monitored in real time and linked into a computer controlled alarm system to alert site personnel of unsafe levels of airborne contaminants. The monitoring programme ensured effective control was maintained, airborne dust leaving the site was not contaminated and site staff were not exposed to unacceptable concentrations of airborne contaminants.

Monitoring began for a full list of possible contaminants. This list was reduced as compounds were confirmed to not exist on the site, creating significant cost savings for the client without compromising the effectiveness of the monitoring.

### Soil stabilisation and disposal

URS formulated stabilisation methods and undertook bench scale trials and analysis to determine the most effective options for meeting the relevant landfill disposal acceptance criteria and to manage the expected large volume of soil.

Wastes from the pit fell into four categories: hazardous chemicals in drums, contaminated soils, general waste and contaminated wastewater.

The evaluation of treatment and disposal options for each of the waste streams required all materials were washed, stabilised or treated to enable disposal with no risk to the environment. A strict waste manifest system was implemented to track all waste leaving the site on to their ultimate disposal sites.

- Chemicals were decanted into containers for disposal by incineration in France. All drums (empty or full), were triple washed, crushed and disposed at the local landfill. The manual handling and crushing of drums minimised the volume of materials disposed to landfill, saving disposal costs and landfill space
- Soil contaminated by discharges from leaking or rusted containers was stabilised on site using lime and activated carbon to meet the landfill's leaching criteria. Use of

activated carbon also reduced the bulking of the material disposed at the landfill

- General wastes were washed on site to remove contaminated soils and chemical residues to allow the general waste to be disposed at the landfill as non hazardous material
- Site wastewater generated from washing general waste and triple washing the drums was treated by the remediation contractor to meet acceptance criteria for discharge to trade waste.

### Unexploded Ordnance (UXOs)

Much to the team's relief it was determined there were no UXOs buried at the site.

### Outcome

All remediation works were completed with no human health, environmental incidents or any structural damage to the fuel bunker. The remediation practices and active dust mitigation, coupled with extensive air monitoring, ensured there were no unacceptable discharges to the environment. Subsequent tests on the remaining soils confirmed that the contamination has been removed and that it now generally meets residential (parkland) acceptance criteria.



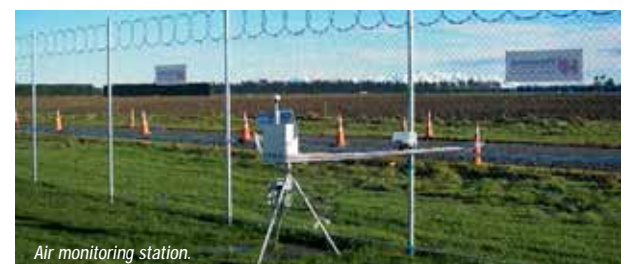
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Site pre-remediation.



Site post-remediation.



Air monitoring station.

**Remediating a large contaminated site takes time, often decades, with the desired outcome of returning the site to a standard suitable for human use.**

## Remediation of a contaminated site



Trade Waste Treatment Plant during demolition.



CALM showing capping layers.

In the case of the former Dandenong Treatment Plant (DTP), it has taken more than 14 years to reverse 56 years of soil and sediment contamination deposited by the plant operations. The former domestic sewage and trade waste treatment facility, set on 190ha in Melbourne's outer eastern suburbs, is already transforming into a residential and industrial park development, as each section is signed off by URS.

URS's involvement in resurrecting the site has been ongoing since October 2000, when site owners Melbourne Water first commissioned URS Environmental Auditor Ken Mival to undertake an Environmental Audit under Section 53X of the *Environment Protection Act 1970* on the entire site. The Environmental Audit system was established by changes to the Act in 1989 following the evacuation of residents from a site heavily contaminated with lead in the suburb of Ardeer, Melbourne.

"The DTP site was closed in 1996 and fenced off from the public due to the discovery of dioxins in sludges in the lagoons," Ken said. "A series of investigations were carried out by several consultants on behalf of Melbourne Water, and in 2000, this evolved into preliminary clean up plans which came to me for consideration."

In the process of his audit, Ken had to consider a range of issues including:

- Remaining infrastructure such as underground pipes, roads and other engineered structures, lagoons, buildings and other utilities
- Sewage sludges stored in lagoons and some burial locations, consisting of gritty sandy silt/clay with a large volume of fibrous organic matter and variable concentrations of chemicals
- Soils affected by the suspended solids component of the irrigated effluent, or incidental releases of sludge, waste water or other materials used on site
- Whether groundwater had been polluted.

His early review of investigations at the site indicated the presence of a range of contaminants in soils and sludges, dominated by the presence of significant concentrations of dioxins. The Victorian Environment Protection Authority (EPA) provides no guidance on acceptable levels for dioxins in soils, therefore, as part of the 53X Audit, URS carried out a human health risk assessment in 2001, and updated it in 2003. This evaluated acceptable limits for dioxin contamination that could be allowed to remain in surface soils. Ken then further advised Melbourne Water on appropriate target criteria for the clean up relevant to the proposed future land uses.

A Capped and Lined Mound (CALM) was put forward by Melbourne Water's consultants to the EPA to obtain a works approval as the most suitable approach for managing the wastes generated in the remediation process. Ken was therefore further commissioned by Melbourne Water to undertake a second Environmental Audit under Section 53V of the Act (assessment of the risk of harm to the environment) that the construction of the CALM met with the EPA's requirements. Community consultation with local residents and action groups, as part of the approval process, indicated acceptance that the retention of the contaminated material on site was preferred to trucking large volumes of contaminated soils from the site to landfills.

In 2006, Melbourne Water's contractors started clean up by excavating and stockpiling impacted soils along with contaminated sludges into one of the former lagoons at the site. This permitted early release of parts of the site for industrial development providing cash flow to Melbourne Water, and the construction of the much need South Dandenong Bypass as part of the East Link trunk road network.

In 2008 sequential construction of the CALM's six cells began across the surface of two of the DTP's former lagoons, after they had been cleaned up.

One of the challenges for the site remediation was the extremely high cost of dioxin analysis. It was therefore decided very early on that there would be no attempt to segregate sludges on the basis of dioxin concentration, as the cost of testing would have been greater than placing it in the CALM. Similarly, in validating the clean up, it was accepted that, if dioxin was found, excavation of soils would continue right up to the point at which no more was detected, or the concentration was acceptable.

"The whole process almost became derailed when some concentrations of dioxins were found in areas and at depths that shouldn't have been exposed to pollution," Ken said.

"Investigation of this eventually proved there are two distinct populations of dioxins, one equivalent to local background due to forest fires and industry, and one at not more than a half metre depth, representing the introduced pollution."

This distinction allowed the background population to be managed based on average concentrations across the site whilst the pollution was removed.

It was calculated that between 600,000m<sup>3</sup> and 800,000m<sup>3</sup> of material would need to be managed. The cost of sending this off-site to a suitable facility for long term containment, or for treatment, would have been well beyond the means of Melbourne Water, and none was available with sufficient capacity. Therefore, the CALM also provided the only reasonable and economic solution to the problem.



Lagoon in 2000 before cleanup commenced.

Remediation works are now close to completion, and all remediation waste has been placed within the CALM and the cap finalised. Development of the northern portion of the site for residential purposes is approximately 50% complete, while the southern portion of the site has been sold and construction of Victoria's first Eco-Industrial Park is progressing. The northern and eastern paddocks have been signed off and the final section of the site has been remediated and the reports to EPA should be wrapped up by early 2011.

Independent of the clean up at the site, Melbourne Water also undertook to create a series of wetlands along the length of Dandenong Creek that is located between the site and the East Link Freeway. A walking and cycling track is located alongside the creek and Melbourne Water has retained this land, and the area set aside for the CALM, for public access. The CALM itself is being grassed and will be useable for passive recreation and the adjacent area is intended as a natural auditorium for some soccer pitches, becoming a community asset.

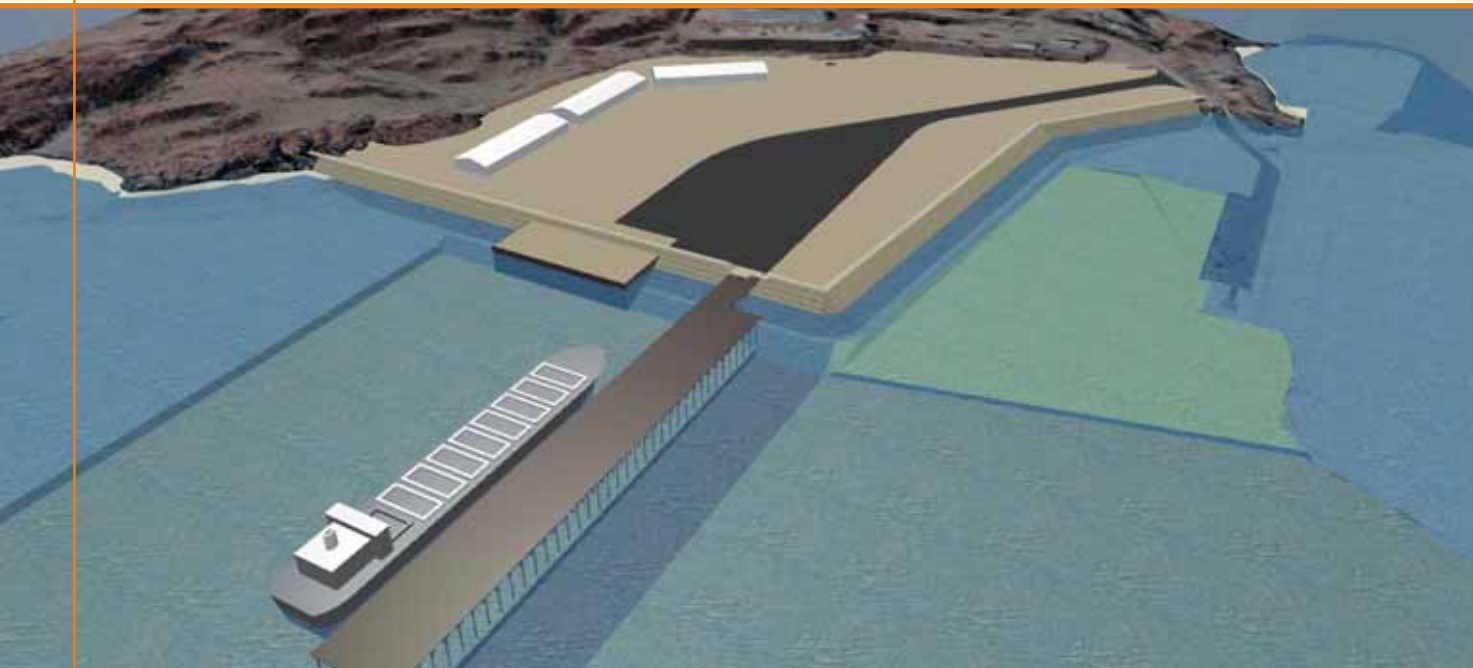
Melbourne Water has indicated due to the efficiency of the contractor, and through a balanced outlook on management of the contaminated soils, the clean-up has met with their targets and come in on budget, a significant achievement for a large contaminated site.



**For further information about this project or management of dioxins, contact Ken Mival, Senior Principal. E: [ken\\_mival@urscorp.com](mailto:ken_mival@urscorp.com)**

**Dampier Port Authority calls upon URS's specialist skills in ports and harbours to investigate concepts and costs for the proposed port upgrade.**

## Upgrade of Dampier Marine Services Facility, Western Australia



3D concept design for Dampier Port Authority.

Due to an increased demand for berthing space and lay down area at the Dampier Port, the Dampier Port Authority (DPA) has investigated concepts and costing of an upgrade to the port including construction of a land backed wharf, rock loadout facility, heavy lift offload, roll on/roll off facility, barge loading facility and reclaimed land for laydown (storage). The requirements were for the maximisation of the laydown area, minimising impacts on the environment and aboriginal heritage areas while providing a deep enough berth pocket to allow for panamax sized vessels. It was also necessary to minimise the effects of reflected waves into the Pluto area owned by Woodside and to ensure vessels had an adequate turning circle without entering the Pluto exclusion zone.

The client had a number of preliminary potential layouts which needed to be analysed with a view to arriving at a concept development plan. The client engaged URS to prepare concept designs and preliminary costing in order to maximise the operational effectiveness of the facility. The concept layouts required the use of specialist engineering designs including rock armoured sea wall, land backed wharf, deck on pile and fender systems.

URS has a history of designing and managing construction of port and harbour works and is able to use this history to provide cost estimates. In the process URS undertook a quarry study, investigated the anticipated future heavy lift vehicle requirements and created a 3D computer model of the site in order to calculate volumes of dredging and reclamation fill. The original URS scope was to review existing data and prepare a port master plan. Over time the scope grew to include preliminary designs and cost estimates and initiation of geotechnical and wave studies to enable the

project to proceed to the next stage. URS is currently undertaking the detailed design of the seawalls which have involved 3D physical model studies of the port.

The URS master plan addressed the client's needs in terms of berth space and at the same time provided a significant increase in scarce laydown area by reclaiming all the dredge spoil within a large bunded area. This not only improves the economic benefit that can be derived from the development but significantly reduces its environmental impact.

There are a number of technical challenges impacting on this site ranging from wave climate to shallow subsurface granophyre (hard rock). The master plan layout oriented the berths into the prevailing swell direction so vessels were bow/stern on to waves and able to berth alongside the wharf without breakwater protection. The jetties were also moved seaward in order to avoid the granophyre. This reduced wharf construction costs while providing greater laydown and allowed balanced volumes of dredge cut and reclamation fill. Once the concepts were prepared URS in conjunction with the DPA conducted a value engineering workshop. This involved gathering the project's relevant stakeholders and independent technical specialists to review the concepts and provide comments on ways to minimise costs and increase functionality of the port. This process resulted in some significant improvements which provided greater operational flexibility and reduced environmental impact.



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General view of the reclamation lay down area for the facility.

## URS provides next generation with a green start



In June 2010 the new environmentally designed Mission Heights Kindergarten, designed by URS's Mechanical and Electrical team in Auckland, was opened.

Previously there had been three basic building designs used in the Auckland Kindergarten Association's 107 existing kindergartens throughout the Auckland region. These existing sites all had issues with internal comfort conditions being too hot in the summer and too cold in the winter.

The team undertook surveys of all three existing building types and implemented a generic design solution for the new building that could be retrospectively adapted to each of the three existing building types. Design features include:

- Utilising natural ventilation across rooms where possible by ensuring that low level supply windows faced the prevailing winds and installing high level actuated exhaust windows
- Using solar glazing on all windows and shading
- Increased insulation throughout
- Procuring energy efficient electric heaters and lighting
- Supplying supplementary mechanical displacement tempered outdoor air to occupied areas at low level through wall diffusers and extracting return air via high level grilles in ceiling to improve thermal air efficiency via cross flow heat exchangers
- Fast response radiant heating for efficient winter warm up.

The client, the Auckland Kindergarten Association is the largest in New Zealand. Their new Early Learning Centre caters for children aged three months to six years.



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**GLNG is Australia's first major coal seam gas to LNG project to receive environmental approval from the Queensland Coordinator-General.**

## EIS success in Queensland

## Geelong Racecourse drought-proofed



Over the past 10 years URS has prepared 24 environmental impact statements (EIS) for clients within the mining, mineral processing, power, infrastructure and oil & gas industries in Queensland.

Each of these projects received environmental approval, with the most recent being state government approval of the Gladstone Liquefied Natural Gas (GLNG) for Santos Limited (Santos). GLNG is Australia's first major coal seam gas to LNG project to receive environmental approval from the Queensland Coordinator-General.

This project is now awaiting federal approval under the *Environment Protection and Biodiversity Conservation Act 1999*, this is expected in October/November 2010.

URS was engaged by Santos to prepare the EIS for the project which included an LNG facility, a 420km gas transmission pipeline and coal seam gas fields. URS undertook the environmental assessments and EIS documentation as well as the preparation of the environmental management plans and regulatory approvals plan.

Following state government approval URS is now assisting Santos in the preparation of the various downstream approval applications, which are required to be reviewed and approved by various state government departments prior to construction commencing.

Chris Pigott, URS Project Director said the close and constructive relationship between Santos and URS was one of the keys to success.

"We relied on the whole team throughout the process from scoping, baseline environmental studies and project definition to impact assessment studies, document preparation, peer review and document finalisation.

"The comprehensive risk identification and assessment process undertaken early in the project also helped direct and define the studies," he said.

Past EIS projects have included the Clean Fuels Project for Caltex, Caval Ridge Coal Mine for BMA, the Townsville Zinc Refinery for Sun Metals and Yarwun Alumina Refinery for Rio Tinto.

In Queensland, URS is currently working on six major EIS projects.



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A stormwater harvesting system designed by URS has ensured the future of horse racing in Geelong by enabling the local racecourse to access stormwater catchment run-off, effectively drought-proofing the facilities.

In 2009, Geelong Racing was unable to use its turf track for five months due to state-wide water restrictions. In an effort to avoid future drought-related disruptions to race meets, Country Racing Victoria (CRV) and Racing Victoria Limited (RVL) commissioned a study into alternative water supplies for irrigating the Geelong Racecourse.

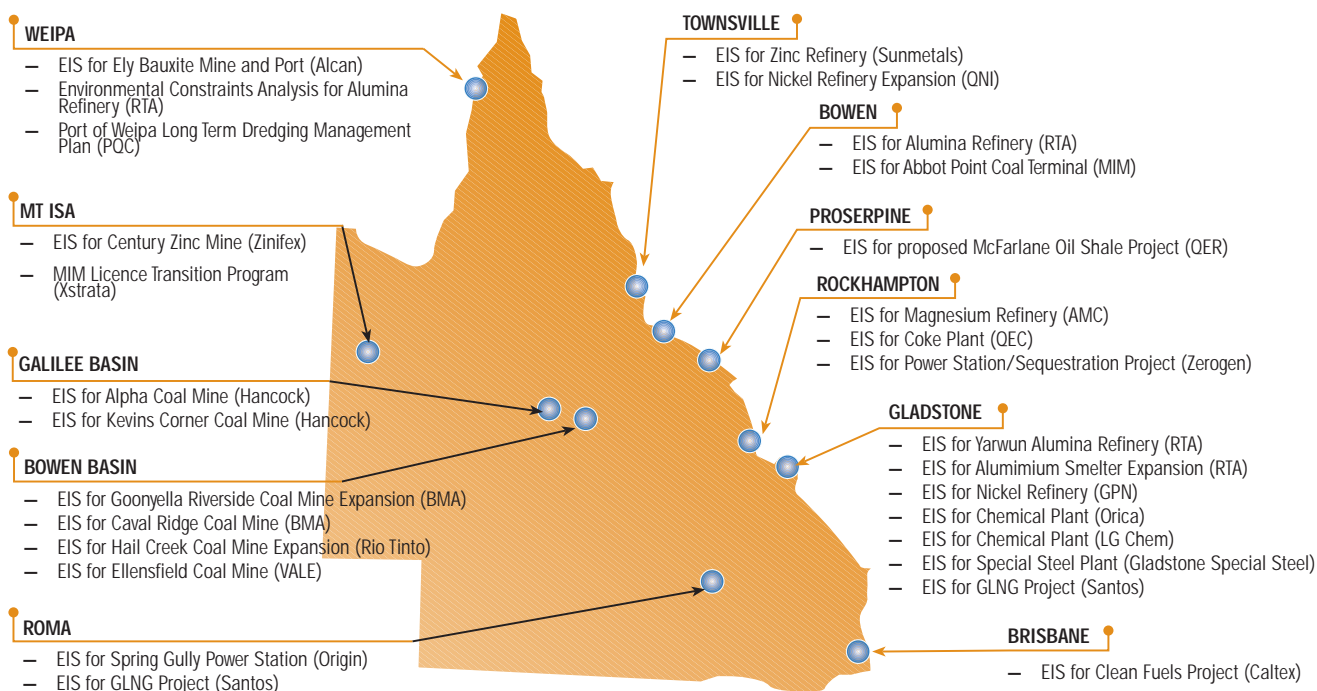
URS's experience in stormwater management and water transfer systems is extensive and provided Geelong Racing with expert analysis of four alternative water supply scenarios, which included groundwater extraction, using roof water and stormwater run-off at the racecourse, accessing water from neighbouring industry, and collecting stormwater from the near-by council drainage system.

In addition to advising stormwater run-off as the most feasible option, URS recommended the infrastructure that would need to be constructed in order to harvest this water. A storage pond, a pump station and a 750m connecting pipeline to harvest water from the urban catchment and deliver it to the Geelong Racecourse's on-site 70ML reservoir was recommended. Once in the reservoir, the stormwater would be distributed through Geelong Racing's existing irrigation system. URS conducted a range of site investigations, including site surveys and sub-surface geotechnical investigations and detailed water balance modelling, to design an efficient and effective stormwater harvesting system.

URS undertook the functional and detailed design of the stormwater harvesting system, and technical superintendence during construction, which was completed in early 2010. The Geelong Racing Water Harvesting Project, which was jointly funded by CRV, RVL and the State Government, became operational in May 2010 and has alleviated the racecourse reliability on reticulated potable water supply.



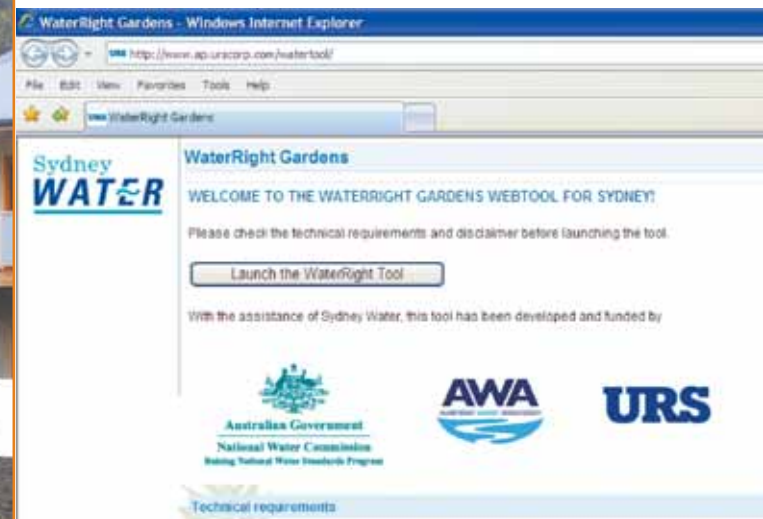
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**National Water Commission,  
Sydney Water Corporation,  
ACT Government and SA Water.**

## Gosford City Council sewerage infrastructure refurbishment program sets a new benchmark in best practice

## WaterRight Gardens Webtool



URS conducted three large and fourteen smaller projects, including Hardy's Bay (above).

*After conducting a cost effective analysis and further commercial investigations, URS used the innovative bladder type surge vessel within their design, resulting in significant savings on ongoing operation and maintenance costs for the nominated life of the pump station.*



Erina (above) and Hardy's Bay (top) design drawings provided courtesy of ADW Johnson Central Coast office.

Over the period between August 2009 and August 2010, URS provided design and engineering services to assist Gosford City Council with their ongoing multi-million dollar sewer pump station refurbishment program.

Commencing as a minor role assisting council with project scoping and basic equipment specification, URS's involvement expanded to the project scoping and design of three large pump stations within the Gosford region while simultaneously undertaking necessary investigations, assessments, and minor designs to define the requirements of fourteen other pump station refurbishments and upgrades.

URS drew on their global expertise for the project, combining a multi skilled team of mechanical, electrical, structural and civil engineers from the Sydney and Auckland offices, while coordinating specialist sub-consultants to undertake smaller work packages.

The refurbishments established scoping and budget requirements for future capital works for Gosford City Council, providing council with an advanced understanding and management of associated risks for future capital works.

Ben Eccles, URS Project Manager and Lead Mechanical Engineer said "As always, the challenge is to find the most cost effective yet innovative solution for each problem particularly where capital and operational expenditure is limited".

Accordingly URS undertook a cost benefit analysis between a traditional compressor operated hydro-pneumatic surge vessel and up-and-coming technology involving large bladder-type surge vessels, to provide suitable transient protection for the sewer pump station rising main.

URS then conducted further commercial investigations to determine the actual performance of this technology in various applications around the world. Based on the positive findings URS used the innovative bladder-type surge vessel within their design, resulting in significant savings on ongoing operation and maintenance costs for the nominated life of the pump station.

Three other cost effective solutions included the alteration of pump station pipe work to improve pumping efficiency; encouraging and undertaking workshop meetings with council's operations personnel to ensure key operating scenarios could be easily undertaken without safety concerns or costly equipment; and encouraging and implementing a stakeholder consultation process. The stakeholder consultation, which included local residents, resulted in minimal design changes or delays to meet stakeholder expectations, and is subsequently now part of Gosford City Council's design process on major projects.



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The Macmasters Beach refurbished pump station (left) with new wet well pumps, pipe work, fittings, protective coating and instrumentation (right).

In December 2008 URS received funding under the Australian Governments 'Raising National Water Standards' programme to develop best practice guidelines for residential water use in Sydney, Canberra and Adelaide. This project builds on the previous studies conducted by URS for Sydney Water through the 'Love Your Garden' initiative, which found many of Sydney's residential gardens were often over-watered.

Over-watering occurs because residents do not know how often they should water, when to defer irrigation events following rainfall, or how the design of their gardens can influence their landscape watering requirements.

The WaterRight Gardens webtool ([www.sydneywater.com.au](http://www.sydneywater.com.au)) addresses these issues by assisting Sydney residents to discover how much water their gardens need, using a combination of outdoor activities and web based questions. Along with an informative series of fact sheets and guidelines, the tool helps residents design water efficient gardens, and choose plants best suited to their local conditions.

Working with the ACT Government, URS delivered a similar webtool for Canberra in June 2009 ([www.thinkwater.act.gov.au](http://www.thinkwater.act.gov.au)); and are currently finalising another 'WaterRight Gardens webtool' for Adelaide with the assistance of SA Water and a stakeholder reference panel.

The benefits of this approach, in terms of potable water savings and long-term behaviour change, are achieved when the outcomes support government policy, particularly with regard to water restrictions.

The initiative can also be designed to complement other demand management programs delivered by government, local councils and water utilities.

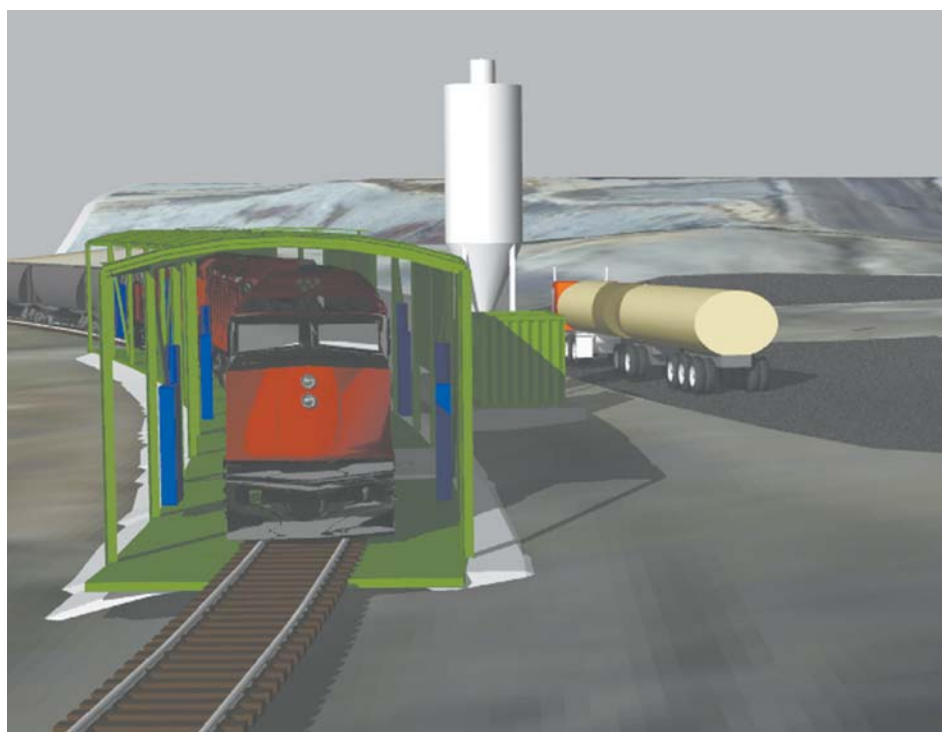
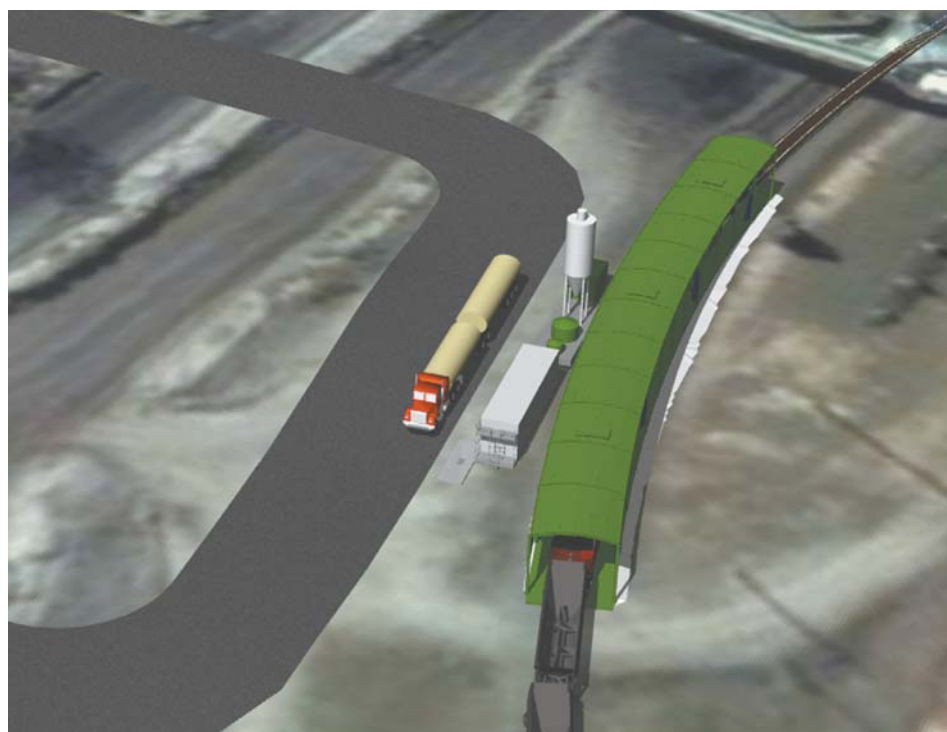
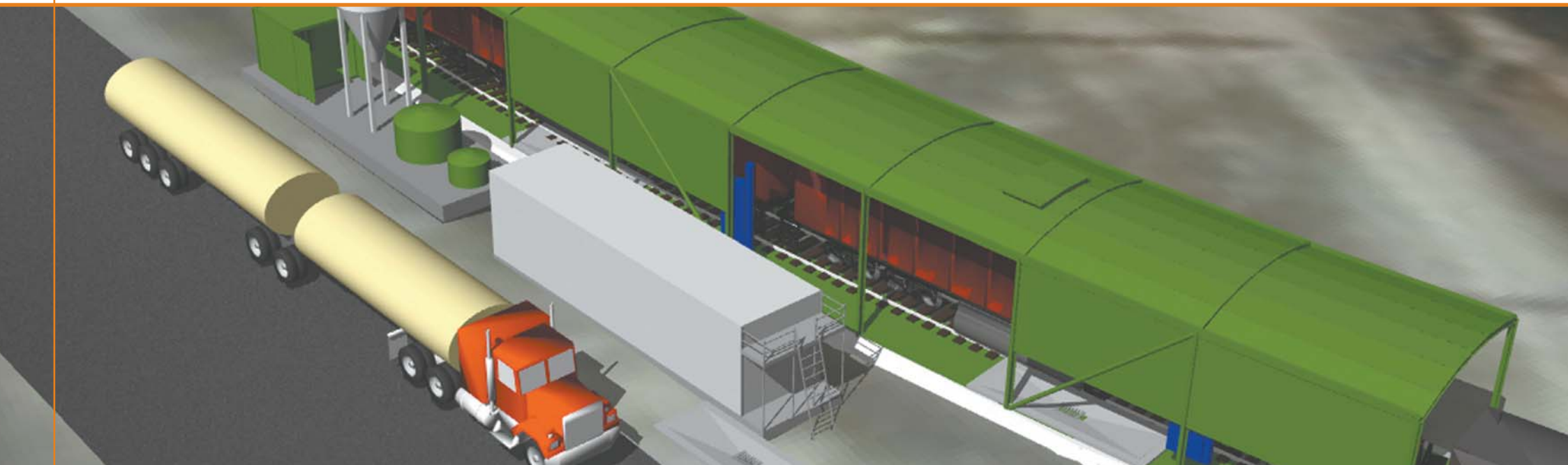
URS wish to acknowledge the valuable contribution of the National Water Commission, Sydney Water, ACT Government, SA Water, the Australian Water Association and all the other stakeholders who have worked hard on this exciting project to turn science into education.



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**URS design has reduced the time for simultaneous re-fuelling and sandbox provisioning in locomotives by half.**

## Coal mine locomotive reprovisioning facilities



In 2010 URS was commissioned to design locomotive provisioning facilities for four coal mines in the Hunter Valley, New South Wales. The facilities are critical to easing the congestion and delays currently experienced at Newcastle's port.

The new facilities will provide diesel refuelling, engine oil top up, sanding box replenishment, water supply for coolant, drinking water, windscreen washer and toilet flushing and window cleaning for the driver's cab during refuelling.

One of the most significant design challenges is minimising the time taken to reprovision. Each train includes three locomotives and takes up to two and a half hours to fully provision one by one using conventional methods. URS created a design to allow simultaneous re-fuelling and sandbox provisioning in less than one hour.

Other challenges involved communicating complex designs to a diverse range of stakeholders including environmental, mechanical, civil and mining engineers, train operators and local council. The use of URS's in-house 3D visualisation (example images above) ensured critical design elements were readily understood by each stakeholder.

Extensive research established the design parameters and included the review of best practice technology for efficiency and value for money. The research was essential to mitigate

risk and procurement delays and resulted in the sourcing of a new sanding system from Germany and the development of spill trays which can be maintained using a 'two-person' manual lift for the capture of hydrocarbons in the fuel system.

Further environmental controls for accidental fuel spills incorporated the use of a self-bunded tank with appropriate valving, gauging, over fill protection and an electric pump for dispensing. In addition, the drainage system incorporated an independent oil/water spill capture system, capable of treating and cleaning a spill.

Each of the locomotive provisioning sites (refuelling stops located on the rail loop approach to the coal loading bins) includes the following design characteristics:

- B-double access for fuel tanker
- Hydrocarbon spill collection system
- Covered reprovisioning area to protect workers and equipment
- Fuel dispensing points to three locations to match the fill points of the locomotives
- Sand pumps located on each side of the locomotive that line up with each set of bogies

- Diesel storage including remote level sensing and a signal to the control room
- Oil storage and dispensing
- Mobile access platform to allow the windscreen of the lead locomotive to be cleaned
- Water supply for washing as well as top up for the windscreen washers and the cabin water supply
- Level crossing to enable pedestrian access to opposite side of the rail for replenishing sand boxes.

The first of these facilities is scheduled to commence operation in December 2010 with final completion of the other three sites scheduled for early 2011.



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## World first—URS to deconstruct a major viaduct whilst motorway remains open to traffic



URS in New Zealand is providing the overall design management, detailed design and construction support for the replacement and deconstruction of the existing Newmarket Viaduct. Construction of this complex, NZ\$215 million, project began in January 2009 and involves five stages over four years with the entire viaduct on track for completion in 2012. Stage 2 construction of the new southbound viaduct was successfully completed and opened to traffic in September.

Considered one of New Zealand's most distinctive engineering features, the Newmarket Viaduct serves as a crucial transportation link for Auckland, the country's largest city. The structure is a six-lane viaduct that carries the Southern Motorway over the Newmarket suburb area. Completed in 1965, it used cutting-edge design for the time (it was New Zealand's first bridge designed using computer analysis) and was the country's first large balanced cantilever bridge. Although the viaduct's design was successful for its time, improvements in the surrounding motorway infrastructure, enhancements in seismic understanding and increasing traffic demands have led to the need for an updated structure.

The Newmarket Viaduct section of motorway experiences the highest level of traffic anywhere in New Zealand, with more than 160,000 vehicles travelling over it each day. As vehicles go from a four to a three-lane highway in the southbound direction, there is daily congestion at peak times. In addition, concerns have arisen about the viaduct's ability to withstand earthquakes, as it was built to far lower standards than are required currently. The stronger and wider replacement viaduct will address these issues by providing better protection to the travelling public and meeting peak traffic demands.

A complete replacement viaduct was decided upon for the project, as it was estimated to cost only 15 percent more than a major upgrade and would provide a longer design life. The new structure is 680m long, up to 22m high and consists of twelve, typically 62m long spans. The superstructure is designed as two continuous box girders with expansion joints at each end—the box girders being stitched together over their full length. The viaduct is being constructed using the pre-cast segmental balanced cantilever method, with a total of 468 pre-cast segments weighing up to 80 tonnes (or metric tons) each.

### Deconstruction—a world first

The most significant challenge of the project is the unprecedented requirement for deconstruction activities to occur with traffic continuing to use the remaining section of the viaduct, and while new construction is ongoing. Extensive analysis had to be carried out to determine the response of the structure at each stage of deconstruction, and

substantial temporary works props and brackets were designed to ensure the viaduct remains stable and serviceable throughout.

### Integrating sustainability practices

The alliance project team (including the client, New Zealand Transport Agency) has placed a strong emphasis on incorporating sustainable practices into both the physical delivery of the project and team operations. The associated goals and undertakings reflect the vision for this project which is 'to seamlessly create a new viaduct that enhances the Newmarket experience for motorists and the community'.

Utilising the URS 3i sustainability framework, the following initiatives are underway:

#### Measuring the project's carbon footprint and taking action to reduce it

Emissions from the Newmarket Connection project are estimated as being equivalent to 29,000 tonnes of carbon dioxide (the same as combusting 11 million litres of diesel). The project's biggest emissions come from the manufacturing processes related to making concrete, cement and steel. Other emissions come from fuel use and electricity.

To try and minimise these projected emissions, the project team has set targets to reduce waste, rework, material and fuel use and are investigating low carbon materials.

#### Implementing a travel plan

The project aims to reduce carbon emissions and to limit the impact of the project on the local community through a focus on travel to and from the worksite. To reduce single

occupancy car commuting, personalised travel plans have been developed for the project team with information on public transport and car pooling options. Community cycling days are also promoted and bus tickets provided for local travel. As well as having an environmental benefit, walking, cycling and car pooling can be beneficial from a health and a social perspective. The travel plan is a story for the local community of a team that cares. Follow-up travel surveys will measure the impact of the travel plan.

#### Aiming to recycle all of the demolition material from the viaduct

In line with the project vision and commitment to environmental responsibility the project team has set a breakthrough KPI to achieve 100% recycling of the demolished material from the Viaduct.

Integrating sustainability thinking on infrastructure projects can make sense on a number of levels – environmentally, economically and socially. Being responsible in how we treat the environment and being thoughtful and creative in our use (and reuse) of resources, needs to become business as usual. Such practices are part of our clients' licence to operate and we are well-placed to work with them in this area.



For further information about this project please contact Jon Vardell, Design Manager. E: [jon\\_vardell@urscorp.com](mailto:jon_vardell@urscorp.com)

For information about our sustainability services please contact Kerry Griffiths, Principal Sustainability Consultant. E: [kerry\\_griffiths@urscorp.com](mailto:kerry_griffiths@urscorp.com)



**URS is helping to shape the future of Hoddle Street,  
one of Melbourne's busiest and most congested roads.**

## Major transportation study



**H**oddle Street is critical to traffic movements in inner Melbourne, it provides access to employment in the CBD and surrounding municipalities, and access to entertainment venues such as the MCG and Melbourne & Olympic Park. It is one of Melbourne's busiest roads and not only does it provide a critical link for north-south traffic movements, it runs adjacent to a suburban train line, is intersected by three trams lines within well-established and residential retail areas, and is serviced by 17 bus routes that access various parts of the road.

The Hoddle Vision Team, which is led by URS and incorporates Aurecon, Denton Corker Marshall, Evans and Peck and CPG, has completed background work and technical investigations to understand the current role of Hoddle Street, and key issues relating to land use and transport planning along the route. The information collected will be used to help inform integrated transport options (traffic, public transport, cycling and pedestrian), that considers land use and urban design strategies to improve the operation of the road and its surrounding environment for all users.

The Existing Conditions Report summarises the results of transport, planning, engineering and environment studies conducted by the Melbourne-based team, including:

- Public transport
- Traffic volumes and patterns
- Existing major infrastructure
- Environmental conditions such as:
  - Geology and hydrology
  - Air quality
  - Road-traffic noise
  - Cultural heritage
  - Flora and fauna
- Planning provisions
- Land use
- Urban design.

The HoddleVision team, based in the URS Melbourne office, includes URS traffic, transport, civil, structural and environmental engineers, air quality scientists, planners, geologists and hydrogeologists.

The challenge for the Hoddle Street Study team is to identify ways to reduce congestion and improve transport flow whilst considering the needs and safety of pedestrians, cyclists and public transport users and the liveability and sustainability of the surrounding communities.

URS was awarded the state government contract in February 2010 to investigate different options for improving Hoddle Street, which includes a comprehensive assessment and triple bottom line evaluation of solutions that consider the complex transport, engineering, social, environmental and economic issues.



The Hoddle Street Study is part of the state government's AU\$38 billion *Victorian Transport Plan*, and includes detailed investigations into integrated transport options to improve the operation of Hoddle Street. The project aims to optimise the movement of people and goods, and enhance the efficiency of public transport and other active transport modes that travel along and intersect the corridor.



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### About URS

URS is a professional services company providing engineering and environmental expertise to businesses and communities within Asia Pacific and around the globe. We are scientists, engineers, economists, planners, project managers and risk management specialists. Together we form a strong multi-disciplinary team bringing knowledge, talent, experience and passion to what we do.

Our extensive capabilities in the Asia Pacific region mean that we offer comprehensive services for specialised assignments as well as large multiphase projects. We operate with a global network of around 46,500 personnel in over 40 countries. In Asia Pacific we have 14 offices with more than 1,500 professionals. So wherever you are on the globe, we can assemble a team with skills best suited to your project.

*4sight – making safety our  
first priority*



- What am I about to do?
- What could go wrong?
- What could be done to make it safer?
- What have I done to communicate the hazards?

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