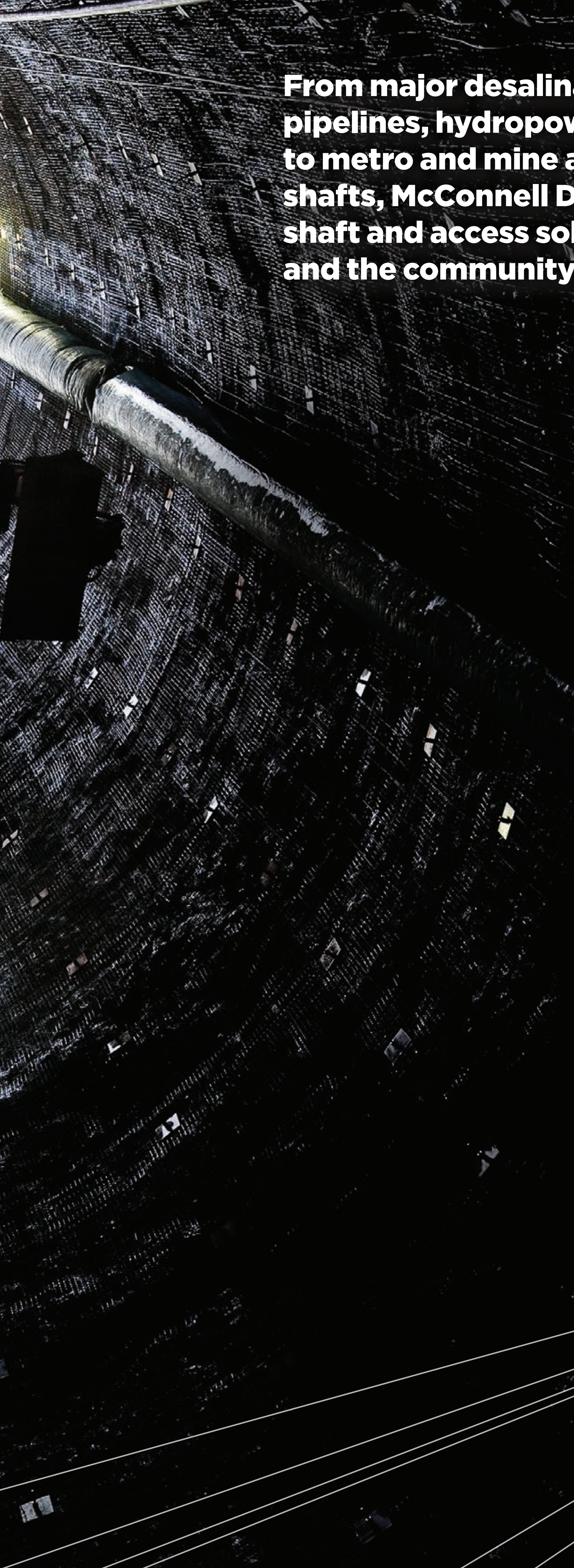
McCONNELL DOWELL
CREATIVE CONSTRUCTION™

Shaft Sinking

DRIVING PROGRESS

Innovation and creative construction in Shaft Sinking.



From major desalination plant facilities, pipelines, hydropower plants and cable tunnels, to metro and mine access and ventilation shafts, McConnell Dowell delivers outstanding shaft and access solutions for our customers and the community.

Capability, Capacity and Creativity

We have been delivering creative underground shaft and access solutions to the international market for water and wastewater management and hydropower development for over 40 years, the mining industry for more than 30 years and power / utility providers for more than 20 years.

Our capability is truly multi-disciplinary. From access declines / shafts for resources, minerals and metalliferous mines; ventilation and emergency shafts for road and rail infrastructure; temporary access / logistics shafts for tunnelling operations; sewerage / stormwater tunnels and drop shafts; water, fuel, gas and oil pipelines construction shafts and rising mains etc. to renewables including hydropower energy and water desalination facility tunnels, shafts and underground caverns, the depth and breadth of our offer drives innovative, cost efficient construction and effective risk management.

In addition, our sister company, Moolmans, is a world leader in shaft sinking and access development, with expertise to sink and equip both vertical and decline shafts of various diameters to depths of more than 2000 metres, through all types of rock formations. Moolmans provides technical support and guidance, through to full partnering with McConnell Dowell, dependent on Project complexity.

Safe, Assured and Committed

At McConnell Dowell, we are committed to safety and ensuring everyone goes 'Home Without Harm'. Everything we do is focused on minimising impact on our customers, the environment and the community.

Our collaborative and professional approach, combined with our ISO accredited project management systems, ensures high quality infrastructure is delivered on time and within budget.

As active members of the Australian, New Zealand and Singapore Tunnelling & Underground Construction Societies, the International Pipeline and Offshore Contractors Association (IPLOCA), Australian Pipelines and Gas Association (APGA) and Australian Petroleum Production & Exploration Association (APPEA), we are at the forefront of industry innovation and best practice.

Our progressive thinking and creative approach is what makes us different.

From ambitious resource projects in remote locations to large-scale, city-changing infrastructure, for almost 60 years customers have been coming to McConnell Dowell with complex projects that require innovative

So we've built a culture of progressive thinking.
It's an approach that looks for opportunities, embraces change and finds different, creative solutions to difficult problems.

Building better communities and providing a better life
McConnell Dowell is founded on a proud heritage of innovation and pioneering spirit. In collaboration with our customers and partners, we have a proven track record in building better communities through safe, smart and efficient infrastructure. Since the early 1960's our reputation has been forged by finding innovative solutions and delivering creative construction outcomes that contribute positively to those communities.

Our progressive thinking, on-going culture of expertise, innovation and creative approach is what sets us apart. It's why our projects consistently win industry awards and why so many of our customers keep coming back to us.

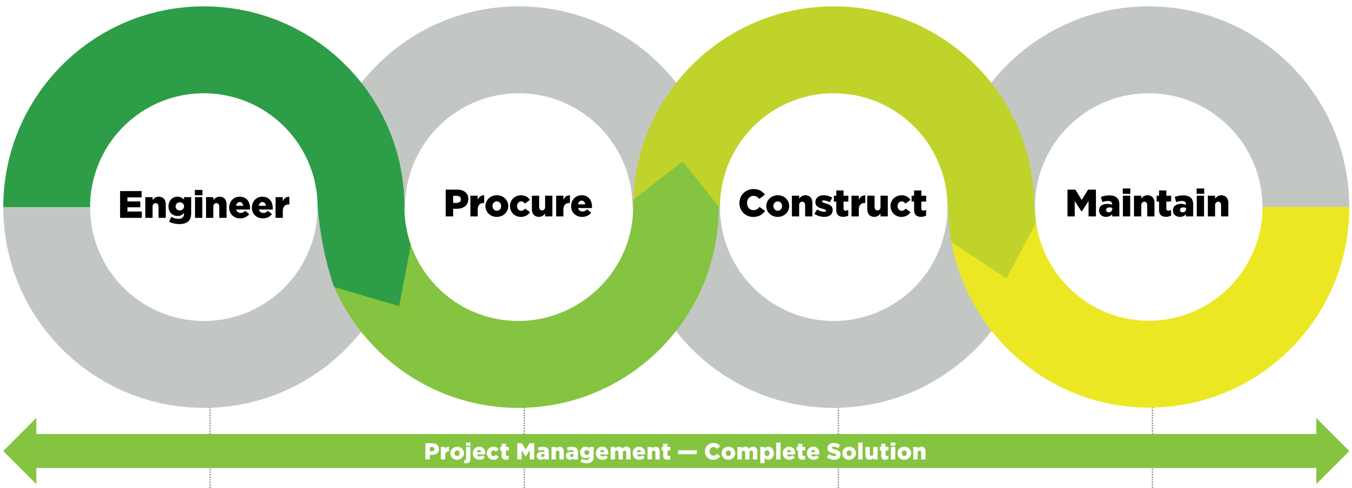
Innovation that improves lives
We care deeply about the people we work with: our customers, our employees, our partners, investors and the communities we serve around the world.

We foster a safe, high quality, systematic and structured approach that allows people to challenge ideas, find hidden insights, look for innovative solutions and deliver infrastructure that improves the quality of life and benefits all stakeholders.

BUSINESS MODEL

A value offering encompassing part or full optimal integration of the complete life cycle of project execution; Project Management, Engineering, Procurement, Construction, Commissioning and Operations.

Value Offering



Opportunity, Pre-feasibility & Feasibility Studies
Conceptual Design
Preliminary & Detailed Engineering
Value Engineering
Technical Solution Development

Contract Administration
Purchasing
Expediting
Material Management
Logistics

Construction Management
Self-perform

Commissioning
Operations & Maintenance
Operations Engineering Support
Sustaining Capital Works
Decommissioning

Market Sectors

Infrastructure

- Power
- Water & Waste Water
- Transport

Resources

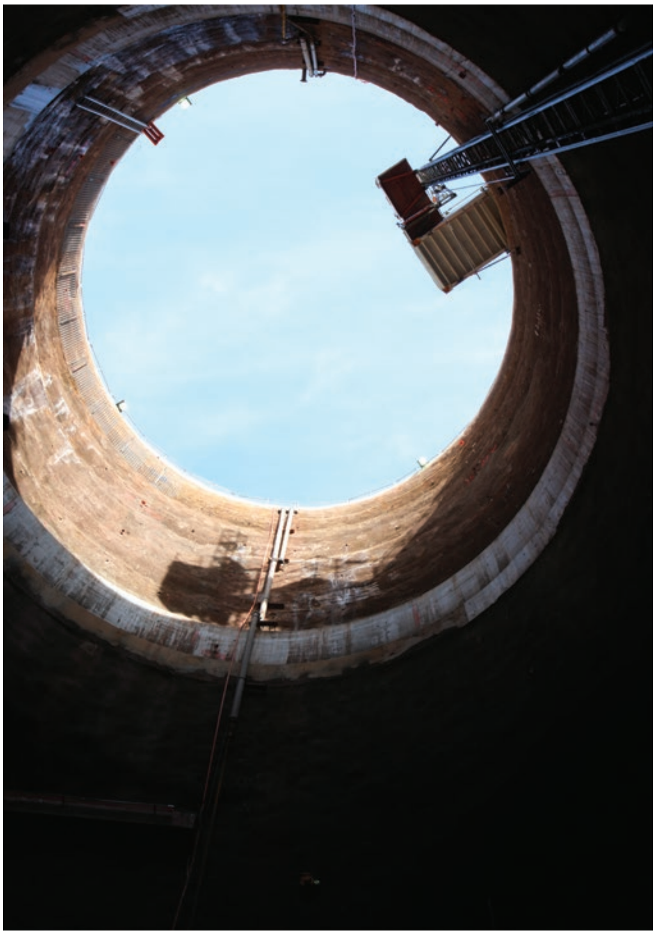
- Mining & Metals
- Oil & Gas
- Petrochemical

Building

- Government
- Commercial/ Industrial
- Social/Residential

Specialist Capabilities

- Marine
- Pipelines
- Tunnelling & Underground
- Rail
- Complex Roads & Bridges
- Mechanical
- Civil
- Fabrication
- Building
- Dams & Hydro



Global Regions

We operate throughout Australia, Asia, New Zealand and the Pacific Islands bringing local knowledge and international expertise.

Group expertise

In addition to the experience from within the McConnell Dowell Group, we can call on our sister company Moolmans, a world leader in shaft sinking.

Like McConnell Dowell, Moolmans is also wholly owned by Aveng and is a South African-based leader in contract mining operating across Africa.

For more than 60 years Moolmans has provided specialised services to the mining industry that include open cut mining, shaft sinking and access development, and underground mining projects. Moolmans currently works on a number of projects throughout Africa and has mined a range of commodities for a variety of reputable clients.

Moolmans has developed strong brand equity through our strong customer relationships, extensive experience in remote and difficult locations, and a track record of sound operational performance.

Moolmans

AVENG GROUP
Leaders in infrastructure development

Sinking and lining of bulk sample shaft
7.25 m diameter to a final depth of 982 m (currently 750 m stage)
Construction of a terrace
Sinking activities to a final depth of 982 m

South Africa

Platreef

Moolmans has showcased its shaft sinking capacity at the Platreef project, which included the construction of a terrace, sinking and lining of the bulk sample 7.25 m diameter shaft to a -750 level, as well as cover drilling and the development of two underground stations at -450 and -750 level.

The contract was awarded by Ivanhoe Mines in August 2013 and work began in January 2014. Moolmans' contract is to conduct all sinking activities to a final depth of 982 m, which included 450 m station, 750 m station, 850 m station, 950 m station and shaft bottom spillage arrangement on 980 m station.

Having successfully completed stations at 450 m and 750 m below surface, the shaft intersected the upper contact of the Platreef deposit approximately 783 m in September 2018. Moolmans began with the 850 m station in November 2018.

Main shaft 8.5 m diameter, 1,000 m deep
Ventilation shaft 7.5 m diameter, 930 m deep
Sinking techniques: five-deck stages, mechanised-drilling jumbos, cactus-grab mucking with kibbles
Aveng Electrical Shaft Safety System

South Africa

Wesizwe

The works included the sinking, lining and equipping of an 8.5 m diameter Main Shaft to a depth of 1,000 m and a 7.5 m diameter Ventilation Shaft to a depth of 930 m. It included the development, construction and equipping of stations, levels and permanent infrastructure. Conventional South African sinking techniques that include five-deck stages, mechanised-drilling jumbos and cactus-grab mucking with kibbles were used.

Four mechanically independent Hepburn winches were used for stage winding at the Ventilation Shaft. Mechanised trackless machinery was used for the development of all horizontal works.

The Aveng Electrical Shaft Safety System was developed, which uses PLCs to control shaft sinking and winder interlocks. The mine was designed for mining both the Merensky and UG2 reef with a shaft hoisting capacity of 270,000 t per month.

Production shaft 10.8 m dia and 385 m deep
Ventilation shaft 6.8 m dia and 322 m deep
Sinking, lining and equipping
Shaft stations and shaft-bottom infrastructure

South Africa
Kalagadi

The scope of work included the sinking, lining and equipping of the 10.8 m diameter production shaft to a depth of 385 m, and the 6.8 m diameter Ventilation Shaft to a depth of 322 m. Both the shafts were sunk through the Kalahari Sands and supported by means of 1.0 m reinforced lining with second toe in at + 36 m below surface.

Further works included the construction of shaft stations, ore passes, pump stations, conveyor loading systems and shaft-bottom infrastructure.

The team was able to boast the sinking of both shafts without a lost-time accident being recorded in either of the shaft barrels. The shaft system was designed to produce 3 million tonnes of run-of-mine manganese ore with the use of mechanised trackless mining machinery.

Main shaft 11.7 m diameter, 180 m deep
Ventilation shaft 9.2 m diameter, 168 m deep
Decline materials shaft 7 m wide, 3.3 m high, 700 m distance
Heaviest deep-slinging operation in Southern Africa

South Africa

Thubelisha

The scope of work included the sinking, lining and equipping of the Main Shaft (11.7 m in diameter) to a depth of 180 m and the Ventilation Shaft (9.2 m in diameter) to 168 m. This included the development and equipping of a Decline Materials Shaft (7 m in width and 3.3 m in height at -17 degrees) for a distance of 700 m; and the development and equipping of the underground coal-storage bunker and all the associated station works and connecting works.

Moolmans tackled the project with a number of new innovations; the design and use of a cantilever headgear for blind sinking, the development of the -17 degree decline using unassisted load-haul dumpers (LHDs), and the development of a low-profile conveyor-loading chute.

A notable achievement was the completion of the heaviest deep-slinging operation in Southern Africa, in which mining machinery weighing up to 65 tonnes was lowered down to the shaft bottom at 165 m, using a mobile hydraulic crane.

Storage tank of 2000 m³ capacity
18.5 m dia x 12 m deep constructed by caisson sinking method
800 m of a new transmission sewer, 10 m deep

New Zealand

Glen Eden Storage Tank and Branch Sewer Upgrade

Design and construction to upgrade the existing wastewater infrastructure in the Glen Eden area and reduce the number of overflows that occur following periods of prolonged heavy rain.

Scope of works consisted of:

- Construction of a 2,000 m³ storage tank under an existing carpark and playing fields in Harold Moody Reserve
- Construction of a new tank overflow to the adjacent Waikumete Stream
- Construction of a new network sewer in Harold Moody Reserve
- Construction of 800 m of a new transmission sewer, 10 m deep, along Glendale Road from Ceramco Park to Harold Moody Reserve
- Construction of a new transmission sewer through Sherrybrooke Esplanade and Parrs Park including a new box culvert, associated connections, and chambers
- Construction of a new network sewer from Rangeview Road to Sherrybrooke Esplanade, including drilling underneath the NIMT railway and construction of a pipe bridge over Waikumete Stream.

Mine Ventilation Shaft

Drill & Blast Method

Pre-Sink 40 m deep with reinforced concrete rings

Final concrete lining 150 mm to 300 mm thickness

New Zealand

Huntly North Mine Shaft

The construction of a ventilation shaft to provide ventilation to Huntly East Mine. The shaft has a finished internal diameter of 4.3 m and when complete will be approximately 270 m deep.

The upper 40 m of the shaft was constructed by blind-sinking a precast concrete caisson through Tauranga Group alluviums. Below 40 m BC the shaft was constructed by drill and blast methods through a series of rock strata.

Due to a change in the Client's situation, unfortunately the Shaft contract was suspended at a depth of 141 m.

Singapore

Downtown Line Stage 2 Mass Rapid Transit - Beauty World Station & Tunnels

2 km of 7 m dia segment lined tunnels
TBM Launch shaft by DWall and drill & blast (28 m x 28 m)
2 Safety Awards by the Land Transport Authority
1 Green and Gracious Builder Award (Excellent Category)

Design and construction of a new Mass Rapid Transit (MRT) underground station and associated tunnels. The station forms part of Downtown Line Stage 2 (DTL2) scheme, to link commuters from the Bukit Timah corridor to the North East Line, North South Line, and Circle Line, connecting the north western part of Singapore to the Marina Bay area.

It represents 40% of Singapore's broader rail network, passing through the heart of the island. When the fully completed, Singapore will have an underground rail network larger than London's rail network. A critical aspect of the project was phasing the works to maintain vehicle and pedestrian access across the site in a very congested part of Singapore.

Scope of works consisted of:

- Two MRT 1,100 m bored tunnels with an internal diameter of 5.8 m
- Two cross passages
- 135 m of cut and cover tunnels
- A new underground station including entrances, subway links, architectural finishes and external landscaping. The station also doubles as a civil defence shelter.

The project was a great success and was completed six months ahead of schedule and under budget. The project team was also recognised by the industry for their impressive safety culture and management record receiving several Health and Safety awards.

3 No. On-shore shafts
Each shaft between 41 m and 50 m deep
Each shaft between 8 m and 17 m in diameter
Winner, Project Management Institute (Global) 2013

Australia

Adelaide Desalination Plant

The Adelaide Desalination project involved the design, build, operate and maintain contract for a 100 GL per annum reverse osmosis desalination plant. The project, nominated for the ITA 2011 Tunnelling Project of the Year, encompassed extensive work in all construction disciplines including bulk earthworks, civil structures, marine, tunnelling, mechanical, electrical and building work.

The shaft works included the drill and blast excavation of three onshore shafts:

- the Outfall and Energy Recovery Shaft — 13 m x 16 m ovoid shaft x 41 m deep
- the Working Shaft — 10 m dia x 45 m deep
- the Intake Shaft — 17 m dia x 50 m deep
- two riser shafts above the IPS via bored pile rotary rig — 26 m deep

Other tunnelling / underground scope of works included:

- the Intake Pump Station (IPS) underground cavern — with a floor level 38 m below ground, and size of 50 m long x 16 m wide x 24 m high, it was constructed by a combination of road header sequential excavation and controlled drill and blast technique
- a 2.8 m ID 1.5 km segmentally lined TBM driven sub-sea intake tunnel
- a 2.8 m ID 1.2 km segmentally lined TBM driven sub-sea outfall tunnel;
- an 8 m high, 2 m dia sea-bed precast RC and GRP seawater intake riser structure;
- six vertical 0.9 m dia outfall riser shafts.

Intakes 13.5 m wide x 24m deep and 14.5 m wide x 29m deep
Drop Shaft 5 m lined diameter and 124 m deep
'Best Renewable Energy Power Plant of The Year' Silver Award
Challenging excavations

Philippines

Ambuklao and Binga Hydro Projects

The project involved the rehabilitation — bringing back to life — of the 175 MW hydropower facility in the north region of Luzon, Philippines.

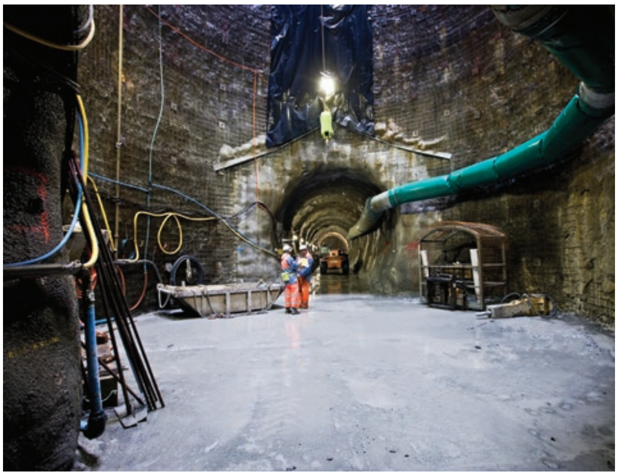
The project scope entailed the rehabilitation and construction of civil tunnels, shafts and tunnels at Ambuklao, as well as an upgrading from 100 to 120 MW of output from the Binga hydropower facility downstream.

The works at Ambuklao included the excavation and construction of an intake structure 17 m high, 13.5 m wide 24 m deep, a 6 m excavated, 5 m lined diameter drop shaft 124 m deep and several drill and blast tunnels of 3.4 m dia of 50 m length up to 6.8 m dia x 191 m length. Works at Binga included an intake structure 6.5 m high, 14.5 m wide 29 m deep, a 5 m dia x 241 m and 7.8 m dia x 159 m long access and headrace tunnel.

45 m deep 6 m diameter cascade drop shaft
GRP lined drill shaft 2.4 m dia 30 m deep
Cascade drop shaft was a New Zealand first
Complex UV shaft cascade structure

New Zealand

Rosedale Ocean Outfall



The project involved the design and construction of a 3 km long (2.4 km onshore and 0.6 km offshore) EPB TBM driven tunnel.

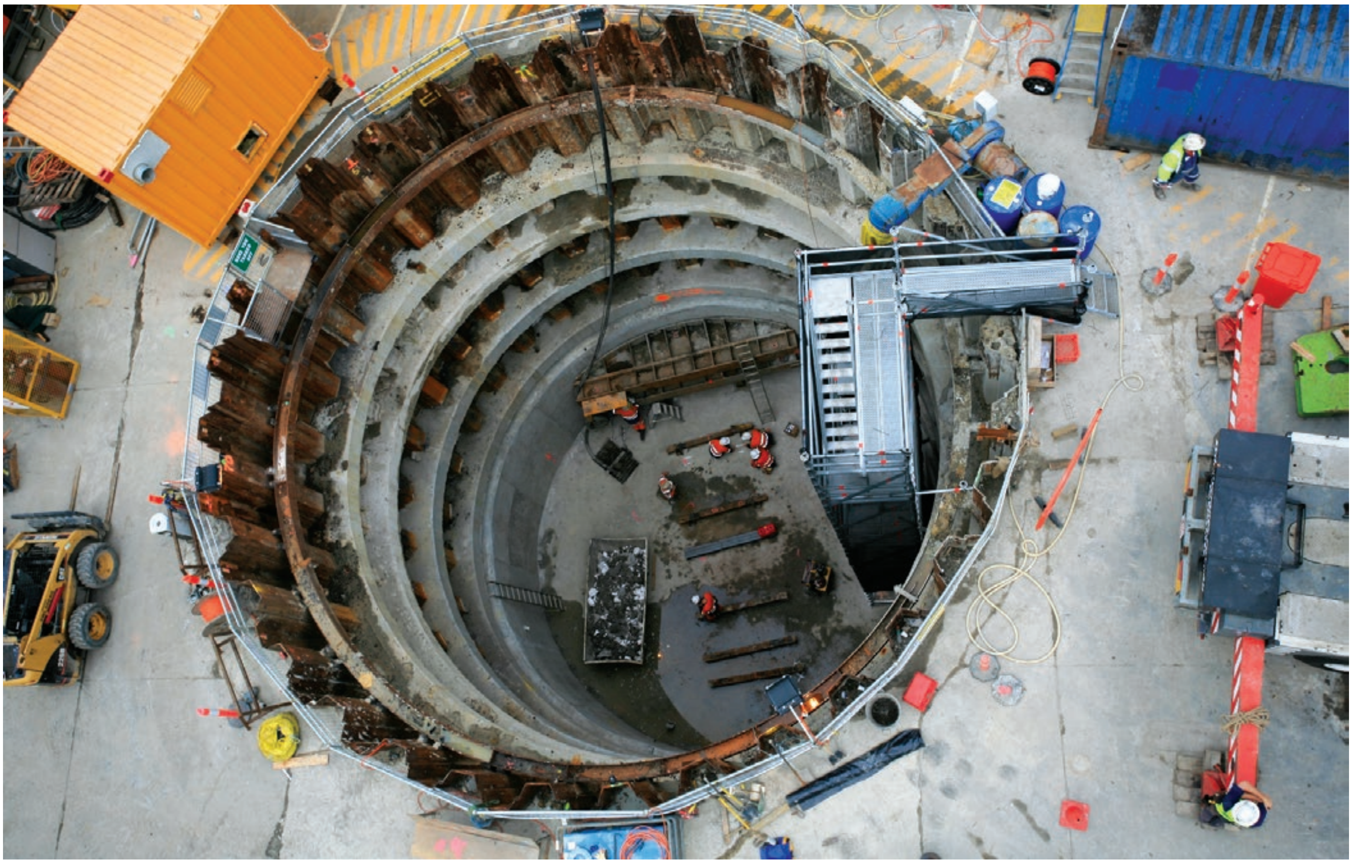
The works included the design and construction of an innovative 45 m deep 6m internal diameter cascade drop shaft and inlet works, which was a New Zealand first; and a GRP lined drilled shaft 2.4 m dia. 30 m deep. Given the deepening of the tunnel a more complex UV shaft cascade structure was installed to allow the shaft to be sunk in the back-shunt.

The cascade drop shaft structure prevented the aeration of water in the outfall, eliminating the need for both a vortex and air relief shafts and was a New Zealand first.

19 No. On-shore TBM recovery shafts
6 m diameter shafts, various depths up to 30 m
Methods: sheet piles, secant piles, NATM, segment caisson sink
NSW Government Partnership Excellence Award

Australia

Sydney Desalination Plant Water Distribution Network



Delivered by Alliance, the EPC project scope comprised of 17 km of pipeline and the 250ML/day pump station infrastructure to convey desalinated water from the plant at Kurnell to the City Tunnel at Erskineville. Main challenges included the laying of 7 km of twin steel pipelines across Botany Bay by a laybarge designed and fabricated on fast-track basis for the project as well as the underwater marine recovery of the 110 t 2.5 m dia TBM 800 m offshore.

Nineteen shafts in total were constructed in weak ground comprising:

- 10 sheet piled shafts; 7 secant bored pile shafts and 2 segmentally lined caisson shafts;
- a deepest shaft of 18 m, shallowest 10 m;
- an average diameter of 13 m

Other tunnelling / underground scope of works included:

- 2.7 km of 2.5 m OD tunnels with 1.8 m MSCL carrier pipe by EPB pipe jacking micro TBM;
- 3.6 km of 2.5 m OD tunnels with 1.8 m MSCL carrier pipe by AVN (slurry) pipe jacking micro TBM's 1 & 2;
- 3.5 km of open cut DN1800 MSCL pipeline.

2 No. shafts by raise-bore method & partial pre-sink
96 m and 140 m deep, and 5 m diameter
Australian Construction Achievement Award 2010
Shaft lining was a mixture of permanent rock bolts and shotcrete, and partial to full concrete lining

Australia

Bogong Hydro Project

The tunnelling works included 6.6 km of 5 m dia. tunnel excavated with a hard rock Tunnel Boring Machine (TBM), 1.1 km of drill and blast tunnel at 4.5 m dia and two deep shafts of 96 m and 140 m depth at 5.0 m dia.

The headpond drop shaft was constructed utilising a 25 m initial pre-sink through weathered rocks with the remainder, plus the entire downstream drop shaft excavated by raise-boring technique. They were lined with permanent rock bolts and shotcrete, with DS drop shaft being fully concrete lined.

4 No. shafts
Each shaft 35 m deep
Drill & blast, contiguous piles, caisson and D-wall techniques
Very constricted site access adjacent to river

Australia

Heroes Avenue Sewage Tunnels

The works included construction of a 645 m, 1,200 mm diameter sewer line to cross under the Brisbane River. To provide access to the micro-tunnels, four 35 m-deep shafts needed to be constructed using a combination of contiguous bored piles, drill and blast, caisson and diaphragm wall construction techniques.

The ground conditions varied from hard fractured water-bearing rock to clays and reclaimed land. Access was very constricted with no closure of Coronation Drive (adjacent to Brisbane River, on the western side) or the adjacent walkway being permitted.

Conventional micro-tunnelling (pipe jacking) involving boring the tunnel for the proposed sewer/drain, using a tunnelling shield (a fully automatic mechanised tunnelling machine) propelled from a launch shaft towards a reception shaft.

- 3 No. shafts, 2 No. as permanent cable entry/exits
- Jet grouting sheet piling and SEM excavation techniques
- High groundwater table, water interconnections to sea
- Very minimal site area to construct the works

Singapore

Sungei Pandan Cable Tunnel

Three shafts were constructed as part of the tunnelling operation and these also presented many challenges. A high ground water table; shaft base heave; limestone rock fissures connections to the sea; and the close proximity to an adjoining industrial premise all added complexity to the shaft design and construction.

The shafts were constructed using jet grouting, sheet piling and sequential excavation method (SEM) utilising bolts, mesh and shotcrete lining techniques.

Shaft Sinking Experience and Capability

McConnell Dowell has a very wide range of experience in shaft construction, dating back to pipeline crossings and hydro-projects in the 1970s to 1980s, requiring shafts for access at depth for tunnelling works. Shafts are also utilised extensively for the mining and resource sectors. We have referenced a list of our more notable projects that include sizeable shaft construction performed by McConnell Dowell.

Location	Description	Contract	Shaft Construction	Year
Singapore	Jurong Island ExxonMobil Pipeline Tunnel	Design & Construct	Bored Pile shafts of dia. 12 m & 8.7 m to 25 m depth	2018–2019
New Zealand	Glen Eden Wastewater Storage Tank	Design & Construct	Storage tank of 2000 m^3 capacity, 18.5 m dia x 12 m deep constructed by caisson sinking method	2016–2018
New Zealand	Huntley North Coal Mine Vent Shaft	Design & Construct	Blind-sink shaft 6 m x 260 m (141 m completed)	2011–2012
Singapore	Contract C916 – Beauty World Station 2 km of 7 m dia segment lined tunnels.	Design & Construct	TBM Launch shaft by DWall and drill & blast (28 m x 28 m)	2009–2012
South Australia, Australia	Adelaide Desalination Plant. Design and construction of desalination plant with three major shafts, IPS cavern.	Design & Construct	Shaft sinking by drill & blast 3 no. 41–50 m deep shafts from 8 to 17 m dia. Cavern 40 m x 15 m x 23 m	2009–2010
Philippines	Rehabilitation of existing Ambuklao & Binga Hydro Plants with 2 km of underground excavations	Construct	Shaft sinking by drill & blast 124 m deep 6 m dia. concrete lined drop shaft & 2 major intake excavations	2008–2010
New Zealand	Rosedale AWTP Ocean Outfall. 3 km 2.8 m dia segment lined tunnel & 2 km 1.6 m dia submarine pipeline	Design & Construct	45 m deep 6 m ID cascade drop shaft; GRP lined drilled shaft 2.4 m dia 30 m deep	2007–2010
New Zealand	Hobson Bay Tunnel Project. 3 km long, 3.8 m ID segment lined tunnel and shafts	Design & Construct	4 no. shafts approx. 35 m to 40 m deep (23 m, 8 m & 10 m ID)	2007–2010
New South Wales, Australia	Sydney Desalination Project. 7 km of tunnelling in Sydney	Design & Construct	TBM Launch and Recover shafts, 16 shafts to 6 m dia, various depths to 30 m	2007–2009
Queensland, Australia	Southern Regional Water Pipeline (SRWP)	Alliance	20 shafts of various size, shape & depths for MTBM	2006–2009
Victoria, Australia	Bogong Hydropower Project. 140MW Plant and 8 km of tunnels and structures	Design & Construct	5 m dia x 140 m deep head-pond & 5 m dia x 96 m deep downstream drop shafts by raise-bore	2006–2009
New Zealand	Pike River Coal Mine. 2.5 km of D&B access tunnel, pit bottom development and ventilation shaft	Construct	110 m deep shaft sinking by drill & blast, raise-boring and Alimak raise method	2006–2009
Queensland, Australia	Heroes Avenue Sewer Tunnels	Construct	4 No. 35 m deep shafts by drill & blast, contig bored piles, caisson & D-Wall	2004–2009
Singapore	Sungei Pandan Cable Tunnel & Shafts	Design & Construct	3 No. shafts. Jet grouting, sheet pile wall, SEM techniques	2004–2006
Singapore	Senoko Cable Tunnel	Design & Construct	Diaphragm Wall and conventional excavation	2001–2003
New South Wales, Australia	Blue Mountains Sewage Transfer Scheme. Tunnel Project 20 km of TBM.	Design & Construct	Shaft construction by drill & blast, 8 shafts to 120 m in depth	1993–1996
Queensland, Australia	Thalanga Underground Mine, decline, side development, vent shaft	Construct	Central exhaust shaft construction by 2.4 m dia	1989–1991

Moolmans Mining Projects

In addition to McConnell Dowell's experience, our parent company Aveng has an established Mining business, Moolmans, in Africa that specialises in mine shaft access and development, the most recent being the Platreef Project in Mokopane. The table below summarises some of the more notable projects undertaken by Moolmans/ Aveng Mining.

Location	Project	Description	Shaft Depth	Year
Mokopane, North West, RSA	Platreef Project	Shaft sinking 7.25 m dia	982 m (ongoing from 750 m)	2014–Current
Rustenburg, North West, RSA	Wesizwe Platinum	Main Shaft: 8.5 m dia Vent. Shaft: 7.5 m dia	1000 m 930 m	2012–2017
Secunda, Mpumalanga, RSA	Shondoni Mine	Main shaft blind-sink 11.7 m dia Vent Shaft upcast 9.1 m dia	165 m 151 m	2012–2017
Codelco-VP, Chile	Chuquicamata, Copper Mine	Vent Shaft: 11.0 m dia	918 m	2012–2016
Hotazel, Northern Cape, RSA	Kalagadi Manganese	Production Shaft: 10.8 m dia; Ventilation Shaft: 6.8 m dia	385 m 322 m	2010–2015
Trichardt, RSA	Thubelisha Mine	Main Shaft: 11.7 m dia Vent. Shaft: 9.2 m dia	180 m 168 m	2009–2014
Balfour, Mpumalanga, RSA	Burnstone	7.5m dia lined shaft Decline	501 m	2008–2012
Konkola, Zambia	Konkola Mine	Main Shaft: 9.0 m x 7.0 m Oval Vent. Shaft: 3.0m dia	800 m 690 m	2006–2012
Steelpoort, Limpopo, RSA	Two Rivers Project	Four declines (8°) Four declines (8°)	1,125 m 1,615 m	2003–2012
Johannesburg, RSA	Central Rand Gold	One decline	165 m	2009–2010
Steelpoort, RSA	Dilokong Mine	Two declines (8°)	600 m	2008–2010
Ogies, RSA	Zondagsfontein Mine	Main Shaft: 11.0 m dia Ventilation Shaft: 6.1 m dia	120 m 108 m	2007–2010
Springs, RSA	Modder East Mine	6.5 m dia shaft	344 m	2007–2009
Ogies, RSA	Irenedale Mine	11.4 m dia shaft	160 m	2006–2007
Ogies, RSA	Frischgewaagdt Mine	8.6 m dia shaft	200 m	2006–2007
Ulundi, RSA	Zululand Anthracite Colliery	6.0 m dia shaft	300 m	2005–2006
Black Rock, RSA	Nchwaning 1 Mine	5.2 dia shaft	450 m	2002–2005
Secunda, RSA	iTemba Lethu Mine	15.0 x 9.0 m dia Elliptical shaft	146 m	2005–2006
Swartklip, RSA	Union Section	3Q Vent. Shafts, 5.1 m dia	72 m	2003–2004

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