

# Precast concrete solutions

Issue 9



Humes has a long history of engineering precast and prestressed concrete solutions and, after 100 years of manufacture, our product range has never been more diverse, more competitive, or more in-tune with our clients' needs than it is today.

Humes offers a range of solutions for bridges and platforms, road and rail infrastructure, tunnels and shafts, stormwater management, pipeline systems, sewage transfer and storage, and retaining walls. We can customise our solutions to ensure they create maximum value for your project, accommodating your site conditions, design requirements and construction factors.

The quality and reliability of Humes' products and services are the foundation of our success. We are constantly developing and improving our solutions, whilst striving to exceed customer expectations.

Our ability to deliver to client specifications on major projects across Australia has established Humes as a valuable and reliable partner.

Humes is a member of LafargeHolcim, the world's leading supplier of building materials.

Today Humes employs more than 1,000 people and is the largest civil precast concrete manufacturer in Australia.



# Strength. Performance. Passion.

Humes corporate values - strength, performance, passion - are in essence a promise to perform and thus help to build and sustain trust with our stakeholders.

Strength – being a solid partner; based on the integrity and competence of our people, and global leadership through the Holcim group.

Performance – delivering on our promises to each other and to our stakeholders, and providing the best solutions for our customers.

Passion – embodying dedication and commitment, and caring about everything we do: our people, our customers, our communities and the environment.

We aim to deliver on this promise through our products, services, communications and, above all, the behavior of our people. We recognize the importance of operating with integrity and apply high standards of corporate governance in the conduct of our business.



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**Note:** Not all products are available in all areas. Please contact your local Humes office to discuss your requirements.

# Precast concrete in construction

The use of precast concrete in construction provides clients with numerous financial and performance benefits:



- Impressive design flexibility – moulds can be built to suit many unique design requirements.
- High strengths – precast concrete provides long life cycles, high loading capacities and long spans.
- Durability and low maintenance – precast concrete provides up to 100 years service for high use applications.
- Improved aesthetics – precast manufacturing delivers grey off-form (made in steel casting beds) to a range of architectural finishes.
- Faster construction – with around 75% less construction time than traditional construction, projects are not held up with manufacturing delays.
- Lower costs – precast construction can provide reduced time on site, reduced propping/scaffolding costs, lower site labour costs, and lower materials storage costs.
- Better site management – construction sites are less cluttered and product deliveries can be timed to suit the project.
- High quality product – controlled purpose-built factories provide a high quality product for our clients.
- Reliable production – manufacturing in covered conditions avoids weather delays.
- Reduced waste – as exact elements are delivered to site there is no manufacturing wastage on site.
- Acoustic performance – a high mass provides an efficient acoustic barrier.
- Reduced environmental impact – manufacturing in a controlled factory environment is more efficient than traditional construction, with less noise, air pollution and debris on site, and it uses recycled materials in production, and allows benefits of thermal mass to be incorporated into designs.



# 1. Custom solutions

At every opportunity we endeavour to create value for our customers; we look for ways to adapt our designs or create new solutions to best meet the needs of our customers' projects.

Humes custom solutions can deliver significant advantages to a project by reducing installation risks, time and cost, and the need for on-site skilled labour. Our quality controlled manufacturing processes can improve the quality of the finished project.

Our in-house team of professional civil, structural, and hydraulic engineers work closely with our customers

to ensure we understand their requirements, and can provide a cost effective solution that meets the necessary specifications.

We are a business committed to research and development, continually sourcing and innovating smarter technologies and designs to bring world class solutions to our customers.



Humes pipes with diffuser off-takes supplied to Smithbridge Australia for the outfall pipeline at NewGen Kwinana Power Station, WA. Humes precast deck planks were also used to create the temporary working jetty. Ross Gorton, Sales Manager visits the project site.



With over 100 years experience in precast concrete design and manufacture, Humes offers a wide range of customisation including:

- prestressing
- post-tensioning
- cast-in items (Humes products or from external parties)
- special concrete mixes
- marine grade concrete
- skews/deflections
- penetrations
- built-in cathodic protection.

Humes has delivered custom solutions for projects throughout Australia including:

- pipeline supports
- coal reclaim and retaining structures
- coal dump shafts
- mine portal and decline structures
- traffic tunnel exhaust ducts
- jacked box culverts.

Humes can convert many in-situ designs into a more cost effective precast option. Contact your local Humes Account Representative today to find out how we can design a solution for your project.



Top row L to R:  
Precast columns;  
HumeSlab® bridge  
deck unit;  
HDPE lined access  
chamber;  
Pipeline anchor  
blocks

Second row:  
Pipeline footings;  
Prestressed girders;  
Overflow chamber

Bottom row:  
HumeDeck® bridge  
unit;  
Bolt-together  
irrigation headwall;  
Box culverts with  
tapered legs;  
Skewed arch units





## 2. Stormwater solutions

Humes has a long history of working closely with designers, project developers, and authorities to provide custom designed stormwater solutions for today's complex project challenges.





# Stormwater drainage

Humes offers a full range of concrete pipes and componentry to provide cost effective design solutions for the management of stormwater drainage.

## Steel reinforced concrete pipes – trench

Humes offers a wide range of pipe diameters, lengths, and classes to meet our customers' project needs.

Our standard concrete pipes are available:

- in DN300 to DN3600
- in standard strength (class 2-4) and super strength (class 6-10) load classes
- usually in 2.4 m lengths, although other lengths can be manufactured on request
- with either a flush joint or rubber ring joint.

The Humes range of job specific pipe fittings, includes bends, junctions, reducers and steel adaptors. All Humes' pipe fittings are manufactured from standard steel

reinforced concrete pipe and therefore share the same properties as the pipeline.

Humes' steel reinforced concrete pipes are manufactured and factory tested for quality to AS/NZS 4058:2007 Precast Concrete Pipes (Pressure and Non-Pressure). Pipes can also be custom made and tested to meet specific customer requirements.

## Steel reinforced concrete pipes – salt water cover

Humes can add an internal surface layer of concrete over the standard 10 mm cover to reinforcement in spun concrete pipe. This sacrificial layer is designed to ensure the pipe is structurally sound at the end of its design life.



## Steel reinforced concrete pipes – jacking

Humes has a comprehensive range of steel reinforced jacking pipes to suit a variety of applications and installation methods. Standard Humes jacking pipes are available from DN300 to DN3600 in class 4.

- Butt joint jacking pipes – a cost effective solution for typical short length applications where high flexibility and a soil or watertight joint is not required. Available in DN300 to DN3000 in 2.4 m lengths.
- In-wall joint jacking pipes – a cost effective solution for typical short length applications needing a flexible watertight joint. Available in DN1200 to DN2250 in 2.4 m lengths and DN2400 to DN3600 in 3 m lengths.
- S series jacking pipes – provide high axial load transfer capacity and a flexible watertight joint . Available in DN300 to DN700 in 2.4 m lengths.
- J series jacking pipes – provide high axial load transfer capacity and a flexible watertight joint (including the interjack pipes). Available in DN800 to DN2100 in 2.4 m and 3 m lengths.

Humes also offers a range of permanent and temporary shafts. Please refer to page 42 for more information.



### Case study



#### Sapphire to Woolgoola Upgrade, Pacific Hwy NSW

Humes worked closely with Leighton Fulton Hogan JV to supply 46,000 m of pipe in a short timeframe, a remarkable accomplishment given some of the project's design and construct challenges.

Right:  
Multiple cell box  
culvert installation  
with Linkslab® unit

## Box culverts

Box culverts are an ideal solution for instant bridging for waterways. Humes precast concrete box culverts suit difficult site conditions as installation requires minimal excavation and backfill. They are designed to tolerate heavy wheel loads even with no or minimal overfill in place.

Humes manufactures a full range of box culverts (from 300 mm to 6,600 mm span) and configurations to Australian Standards AS 1597 (parts one and two). Box culverts are generally available in standard lengths of 1.2 m and 2.4 m but can be manufactured in custom designs such as splayed units. Penetrations, post tensioning ducts, openings and cast-in items such as ferrules can be easily accommodated in box culvert designs.

The box culvert is available either as an inverted U on a concrete base foundation (crown type) or as a U shaped trough with a lid (invert type). Humes designs and supplies precast bases and lids to suit individual box culverts.

Placing two or more box culverts together forms a multiple cell installation. A Linkslab® unit placed between two culverts is a cost effective solution for installations of three cells and above. It also reduces the number of supports which increases the waterway width. A Linkslab® unit usually has the same span as the supporting box culvert but Humes can design a span with a greater width than the crown unit. When depth of fill is minimal, a Linkslab® unit can be designed to sit flush with the top of the crown unit.

## Uniculvert® modules

Humes manufacture Uniculvert® modules where the crown and the base slab are cast integrally minimising site work and construction time.



## Case study



### Tulladunna Bridge, NSW

In just six days the combination of 166 Uniculvert® modules, kerbs, wingwalls, and girders created a new 394 metre rail bridge for the Namoi River at Tulladunna.



## Headwalls

Precast concrete headwalls offer significant advantages over in-situ concrete headwalls:

- less installation time and labour
- no requirement for premix concrete
- 'at-strength' concrete on delivery.

Humes manufactures a range of headwalls (to suit pipes of DN300 to DN3600) to conform to the requirements of individual state and local authorities. Humes also manufactures multiple cell headwalls (for both pipes and box culverts), sloping headwalls and end walls, small box culvert headwalls, and compact headwalls.

For projects with specific needs, Humes can work with you to produce a customised headwall design delivering a cost effective solution.



Top:  
Headwall

Bottom:  
Custom stormwater  
pit

## Stormwater pits

Humes manufacture a wide range of custom and modular precast pit systems for stormwater applications; our range includes lids, grates and covers, base units and risers, and a variety of street furniture to suit different applications and local requirements. Our ability to customise components to suit each project provides design flexibility and economy for installers.

Humes can design and manufacture custom precast pits to suit individual pipeline requirements. Custom pits are available in a variety of sizes from 700 mm square to 2,100 mm plus - with pit depth and hole positions placed to suit each job and minimise construction time and on-site costs. Pits can be trafficable to SM 1600 highway load conditions, with common requirements for ground bearing capacity to be up to 150 kPa.

Modular pits are suitable for junction pits, kerb inlet pits and grated inlets, and are manufactured with knockouts on all four sides to allow for easy installation of pipes. Pits are available in standard pit sizes 450 mm square to 1,200 mm square, with a maximum pipe of DN900.

Our pit systems are fully compatible with our extensive range of stormwater pipes, kerb inlet systems and other drainage products.



## Access chambers/Manholes

Top:  
Access chamber  
with make-up rings,  
cover and surround

Bottom:  
Kerb inlet

Access chambers, maintenance shafts and manholes all describe the same product group – a vertical shaft that connects pipes to the surface. Humes use the term ‘access chambers’ to describe systems that allow worker entry, and ‘maintenance shafts’ to describe non-worker entry systems.

Humes manufacture complete access chamber structures to satisfy various local codes, practices and physical site conditions. Humes’ precast concrete access chambers are suitable for depths up to 6 m in accordance with AS 4198-1994 Precast Concrete Access Chambers for Sewerage Applications.

Humes access chamber systems can be used for:

- new residential and commercial developments
- joining into existing pipelines
- replacing existing access chambers
- vacuum collection and isolation chambers
- air valve and scour pits
- overflow and discharge chambers.

Humes’ componentry includes precast bases, shafts, taper/squat tops, converter slabs, make-up rings, covers and surrounds, with various joint types available to meet local requirements and conditions.

Cored holes and precast benching can be placed at any angle, making the system capable of accommodating



all inlet configurations. The unique Humes Supabowl® conical precast base has an internal surface in the shape of an inverted cone giving the same hydraulic efficiency as traditional channel benched bases but with superior self-cleansing under surcharge conditions. This design eliminates the need for a separate benching process and greatly improves supply lead times.

## Kerb inlet systems

Humes offers an extensive range of kerb inlet solutions for roadside entry points to meet the needs of local authorities. The range is designed to suit all modern kerb and gutter profiles, with a number of standard lengths available.

The Humes range of concrete kerb inlet solutions, such as the one piece kerb inlet arrangement, is a great way to reduce installation times.



## Floodgates

The Hume-King floodgate (also known as reflux valve or tidal flap) is an end-of-line, non-return valve which protects a pipeline from tidal inundation, the entry of debris, animals and vermin, and backflow. The floodgates provide a seal on the minimal vertical end of the pipeline, as the mounting pin (located behind the sealing surfaces) creates a moment-arm to hold the gate closed.

Hume-King floodgates benefit pipeline management through:

- high chemical resistance (to organic solvents, acids, alkalis, and salt water) which delivers a non-corrosive, durable pipeline solution
- resistance to sunlight, ensuring they will not warp in service
- manufacture from materials with low salvage value, discouraging theft and vandalism.

Hume-King floodgates are moulded from fibreglass reinforced polyester, with high tensile 316 stainless steel built-in hinges, and replaceable neoprene sealing rings. They are available to suit Humes standard pipe diameters, in a mounting-ring style for smaller diameter pipes, and a bolt-on style for DN1050 to DN1800 pipes.

Humes can develop and manufacture customised floodgates for non-standard applications.



Top:  
Bolt-on style  
floodgate

Middle:  
Non-standard  
floodgate

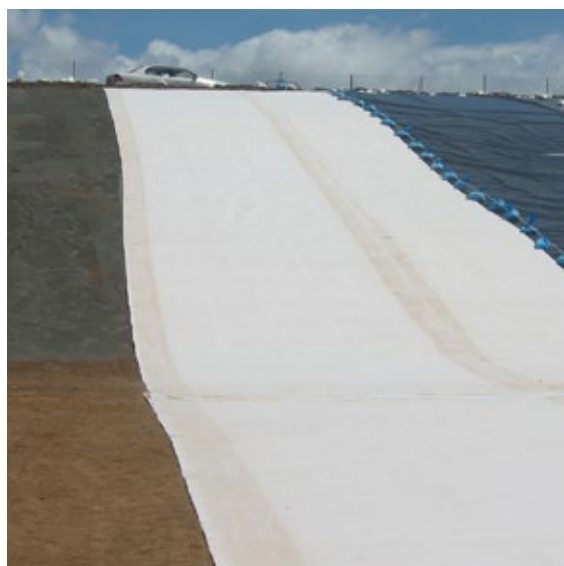
Bottom:  
Geotextile  
installation



## Geosynthetics

Humes offers a range of Geosynthetics including:

- Bidim® – continuous filament non-woven polyester geotextiles
- filter wrap – non-woven geotextile handy rolls
- Greenflo® – HDPE class 400 slotted round pipe (DN100)
- Megaflo® – geo-composite panel drain system
- Geosheet® – cusped sheet drainage system
- Bitac® – high strength multi-laminate tape
- Tensar® geogrids – reinforced earth retaining structures and subgrade reinforcement
- silt fence and sediment control products.



# Stormwater treatment

Humes provides Gross Pollutant Traps (GPTs) for the primary treatment of pollutants and hydrodynamic separators for secondary treatment.

## Primary treatment

### HumeGard® Gross Pollutant Trap (GPT)

The HumeGard® GPT is a pollution control device that is specifically designed to remove gross pollutants and coarse sediments  $\geq 150$  micron from stormwater runoff. This system is designed for residential and commercial developments where litter and sediment are the main pollutants. It is particularly useful in retrofit applications or drainage systems on flat grades where low head loss requirements are critical.

The system utilises the processes of physical filtration and floatation/sedimentation to separate the litter and coarse sediment from stormwater runoff. It incorporates an upper bypass chamber diverting treatable flows via a floating boom, and a lower treatment chamber for settling and filtering coarse pollutants from the flow.

The floating boom and bypass chamber enable the continued capture of floating material, even during peak flows, and the unit prevents re-suspension and release of trapped materials during subsequent storm events.

The HumeGard® GPT is one of the most successful stormwater treatment systems in Australia today, with proven value across a range of projects and installations. A wide range of models are available to provide solutions for normal and supercritical flow conditions.

The HumeGard® GPT:

- provides high performance with a low headloss factor (k) of 0.2
- removes 100% of gross pollutants (>2mm) prior to bypass
- provides at least 41% TSS removal annually
- removes particulate-bound nutrients
- uses independently proven technology
- is designed with low operational velocities (0.2 m/s) to minimise scour
- has a 50 year design life in accordance with AS 5100 and AS 3600
- has internal components made from stainless steel
- was developed and tested by Swinburne University
- is fully trafficable.

## Case study



### Federation Park, QLD

Installing two HumeGard® GPTs at Federation Park, Warwick, has improved public amenity for people enjoying the popular park on the Condamine River, while also greatly improving water quality in this important waterway before it feeds into the Murray-Darling Basin.

## Secondary treatment

### HumeCeptor® hydrodynamic separator

The HumeCeptor® system is an underground, precast concrete stormwater treatment solution that uses hydrodynamic and gravitational separation to remove entrained hydrocarbons and total suspended solids ( $\geq 10$  microns) from stormwater runoff. It can contain spills and minimise non-point source pollution entering downstream waterways.

First designed as an at-source solution for constrained commercial and industrial sites the HumeCeptor® system has since been improved and expanded to service large catchments, inundated drainage systems, and capture large volume emergency spill events. The system is ideal for hardstands/wash bays, car parks, shopping centres, industrial/commercial warehouses, petrol stations, airports and major road infrastructure applications.

Independently tested, and installed in over 30,000 projects worldwide, the HumeCeptor® system is an effective and reliable secondary treatment of stormwater for constrained sites.

The HumeCeptor® system:

- reliably removes 80% of hydrocarbons and total suspended solids (TSS)
- is sized to achieve the necessary water quality outcomes (WQO) on an annual basis
- is independently verified and certified under the NJCAT/TARP protocol in the US and ETV Canada
- has been researched and proven that high flows won't scour captured sediment
- captures particulate-bound nutrients along with the sediment
- allows for emergency spill storage, directional change, multiple pipes and tidal inundation
- is fully trafficable.



Right: HumeCeptor® system being assembled on site



## Detention and infiltration

Most authorities have implemented guidelines around the detention and/or volume reduction for new Water Sensitive Urban Design (WSUD) developments. Humes offers two economical detention and infiltration solutions with enhanced design flexibility to meet regulatory requirements.

## StormTrap® system

The StormTrap® system is a purpose-built stormwater detention and infiltration solution that meets regulatory requirements while minimising the impact on land usability. It is the most cost effective, trafficable, below ground detention system on the Australian market today.

The StormTrap® system takes a unique approach, connecting individual precast concrete modules into a configuration that meets each project's requirements. This delivers a simple and flexible design solution without compromising above ground land use.

The StormTrap® system's design and installation benefits make it a competitive solution for any residential, commercial or industrial project. It is:

- custom designed to best suit your project
- designed using custom software, reducing your design time
- able to deliver the maximum possible detention volume for the smallest footprint
- able to deliver a high infiltration capacity
- below ground and trafficable
- cost effective in constrained sites
- quick to install
- fully accessible and maintainable
- able to meet local detention requirements without compromising land use.

## Soakwells

Humes soakwells are vertical perforated liners which allow stormwater runoff from roofs and hardstand areas to infiltrate into the surrounding substrata.

Humes' soakwells are available in DN600 to DN1800 and depths from 600 mm to 1,500 mm. We also offer a range of cover options including trafficable or non-trafficable, grated or access chamber cover and surround.

## Case study



### Fiona Stanley Hospital, Perth

Humes supplied six StormTrap® detention and infiltration systems with a total combined storage capacity of 12.4 ML. Having the detention basins below ground freed up land for other purposes. Each of the systems were completed and ready to be backfilled in less than 10 days.



Left:  
Soakwells

Opposite page:  
StormTrap®  
detention and  
infiltration system

# Harvesting and reuse

Humes offers a range of solutions for collecting, storing and reusing water that meets our customers' performance and budgetary requirements.

## RainVault® system

The RainVault® system is specifically designed to capture, treat, store and supply rainwater as an alternative to potable water for non-potable applications. The underground system consists of treatment devices, water quality measures, storage components and a pumping system. It can be customised to suit each project's requirements.

Manufactured predominantly of precast concrete, the RainVault® system is a cost effective solution for commercial, industrial and large-scale residential projects from 5,000 L. It is:

- a complete system
- fully trafficable and underground, maximising above ground land uses
- watertight
- modular and flexible in its design
- easy to install
- accessible and maintainable.

## ReserVault® system

The ReserVault® system is an ideal solution where a high quality of water is not required, (e.g. irrigation applications). This 'no frills' model is similar to the RainVault® system, using the same seals and storage components, but excludes the treatment devices, water quality measures and pumping system.

## RainVault® mini system

The RainVault® mini system is a variation of the RainVault® model, and offers a complete below ground rainwater harvesting system for storage capacities from 3,000 L to 7,000 L. The precast concrete system is placed vertically, and the only visible surface component is a small access chamber lid. It incorporates the same treatment devices, water quality measures, storage components and pumping system as the RainVault® system.

### Case study



### Riverstone Crossing, SEQ

A 1ML RainVault® system is used to irrigate one hectare of green space at Riverstone Crossing residential community. Stormwater is diverted from the main drainage system through filters and then stored in the RainVault® system.



## Precast concrete cubes

Humes manufactures precast concrete cubes which provide a safe and secure water source for uses such as car washing, laundry, hot water systems and irrigation, where high quality potable water is not required.

The cubes are available in 3,000 L or 5,000 L modules which can be joined together to create a system with increased capacity. The underground system is designed for structural loads which helps to maximise above ground land use. They incorporate the same treatment devices, water quality measures, storage components and pumping system as the RainVault® system.



Top:  
RainVault® mini  
system

Bottom:  
Segmental shaft

## Segmental shafts

Segmental shafts provide a viable solution for water storage structures where there is a limited footprint but unlimited depth. Segmental shafts have proven very successful in both temporary and permanent conditions due to their ease of installation, enabling shafts to be sunk in difficult ground conditions economically and safely. Shafts are available in standard sizes of 4.5 m, 6 m, 7.5 m, 9 m, 12.5 m, and 15 m diameters. Larger sizes can be manufactured if required.



# 3. Sewage transfer and storage solutions

Humes has developed a range of solutions to maximise durability and eliminate the adverse effects of sewage aggressives present in sewer pipeline systems.





# Sewage transfer

Humes offers a cost effective solution for transferring sewage with our range of rubber ring joint pipes.

Right  
HDPE lined,  
RRJ pipes

## Steel reinforced concrete pipes – trench

The Humes range of high performance steel reinforced concrete pipes incorporate a rubber ring joint (RRJ) which is recommended for sewage applications. The RRJ provides a watertight seal against infiltration into the system, and sewage leakage into groundwater, and gives the pipe a high degree of flexibility to accommodate ground settlement or alignment adjustment. Standard sewer pipes have a minimum cementitious content in excess of 400 kg/m<sup>3</sup> which is adequate for most properly-designed sewer systems.

Humes' sewerage pipes are available in DN300 to DN3600, in standard strengths (classes 2-4) and super strengths (classes 6-10).



# Corrosion protection for sewerage system components

While Humes' sewerage pipes and products are designed to serve over 100 years in accordance with AS/NZS 4058, we offer a number of specialty variations and linings to increase durability and manage corrosion.

## Extra cover to reinforcement

Adding extra cover increases protection when the system's designer has little or no information to carry out a detailed pipe system analysis. The cover can be increased from a nominal standard to lengthen the life of the pipe by up to two times.

## Calcareous aggregate

Manufacturing concrete pipes from calcium rich aggregate such as limestone, increases resistance to acidic corrosion, by inhibiting the progress of the chemical attack. It is most effective when incorporated as a sacrificial layer and can lengthen the pipe life by up to two times.

## Corrosion protection linings

Lining systems are able to bridge any discontinuities in the pipe/structure wall, which is a distinct advantage over coating systems which depend on the integrity of the surface for functionality.

Humes supplies two thermoplastic linings to prevent sulphide attack/corrosion in sewage applications:

- **Plastiline® lining**

This chemically inert plasticised PVC material is mechanically fixed to the pipe's internal surface during the manufacturing process and gives superior protection against chemical attack inside the pipe. Plastiline® lining has been in use across Australia for over 45 years, is easy to weld and is suitable for both precast and in-situ applications.

- **HDPE lining**

High density polyethylene (HDPE) lining suits both precast and in-situ applications. Firmly anchored to the pipe, the lining forms a superior protective layer able to withstand both abrasion and harsh chemical environments. This material is available in a variety of colours, including pale colours which allow easy visual inspection. HDPE lining is available in 2 mm to 5 mm thicknesses in sheets up to 3 m wide.

## Case study



### Alkimos Wastewater Scheme, WA

With an unparalleled ability to manufacture lined reinforced concrete pipes, Humes was chosen to supply approximately 1,450 metres of 1,950 mm and 1,200 mm HDPE lined class 4 and 6 pipes and specials for the open trench section of the Quinns Main Sewer.

# Storage, overflow and pump stations

Humes has storage solutions, overflow tanks and pump stations to meet specific project needs, including vertical and horizontal configurations and a variety of capacities.

## Storage tanks

Humes can design sewer storage tanks using our range of steel reinforced concrete pipes, which is an ideal solution where unique footprints or depths are required. These storage tanks are available from DN1200 to DN3600 in a variety of storage capacities, and are configured with end walls and fittings to meet project specific needs. The entire precast concrete solution can be provided with corrosion protection liners to meet specific durability requirements.



Top:  
Storage tank

Bottom:  
Segmental shaft  
installation

## Segmental shafts and one piece shafts

Segmental shafts are a viable solution for bulk sewage storage/overflow structures where there is a limited footprint but unlimited depth. Segmental shafts have proven very successful due to their ease of installation, cost effectiveness, and suitability in difficult ground conditions. Shafts are available in standard sizes of 4.5 m, 6 m, 7.5 m, 9 m, 12.5 m, and 15 m diameters. Larger sizes can be manufactured if required.

One piece shafts are available in 3 m and 3.6 m diameters which are ideal for medium size storage tanks.



## Pump stations

Pump stations are used for a variety of infrastructure systems including the transfer of sewage to treatment plants. Humes supplies precast concrete chambers up to DN3600, which can be designed to meet customer requirements.

# Inspection and maintenance

Humes has worked closely with designers and authorities to develop a range of inspection and maintenance solutions which minimise site work and reduce installation time and cost.

## Access chambers/Manholes

Top:  
Access chamber  
cover and surround  
installation

Bottom:  
Supabowl® access  
chamber base unit

Access chambers or manholes are vertical shafts that connect sewer transfer pipes to the surface to allow worker entry. Humes manufacture complete access chamber structures to satisfy various local codes, practices and physical site conditions.

The Humes range of precast concrete sewer access chambers is suitable for a depth up to 9 m, in accordance with AS 4198-1994 Precast Concrete Access Chambers for Sewerage Applications.

Humes access chamber systems can be used for:

- new residential and commercial developments
- joining into existing sewer pipelines
- replacing existing access chambers
- vacuum collection and isolation chambers
- air valve and scour pits
- overflow and discharge chambers.

Humes' componentry includes precast bases, shafts, taper/squat tops, converter slabs, make up rings, covers and surrounds. Various joint types are also available to meet local requirements and conditions. Cored holes and precast benching can be placed at any angle, making the system capable of accommodating all inlet configurations.

### The Supabowl® precast base

The unique Humes Supabowl® conical precast base has an internal surface in the shape of an inverted cone, giving the same hydraulic efficiency as traditional channel benched bases but with superior self-cleansing under surcharge conditions. This design eliminates the need for a separate benching process and greatly improves supply lead times.



## Maintenance shafts

### The QuickTee® system

The QuickTee® maintenance shaft is a DN600 vertical shaft for non-worker entry to the sewerage system to introduce inspection (CCTV) and maintenance equipment. The shaft is a complete system offering:

- effective heights from 1 m to 5.5 m
- a robust design for fast installation using ordinary backfill material and techniques
- the ability to accommodate traffic loadings and construction in roadways
- inline storage in the event of system surcharge
- high quality, high strength precast concrete for maximum service life
- an innovative base design to ensure efficient hydraulic performance
- a small site footprint for installation in areas congested with other services
- precisely engineered HumeSeal® joints for watertight performance.

The HumeSeal® joint is a patented mechanical coupling system designed for fast, efficient and watertight jointing of UPVC pipe (DN100 to DN225) into precast or in-situ structures. The joint will accommodate a 90 kPa pressure differential and remain watertight with up to 7° of angular deflection.



Top:  
QuickTee®  
maintenance shaft  
base unit

Bottom:  
A complete  
QuickTee®  
maintenance shaft





# 4. Bridge and platform solutions

The Humes range of bridging and platform solutions includes precast arches, large box culverts, precast modular beams, planks and decking units, and prestressed concrete component bridges.







## Minor road bridges

Humes offers a range of precast and prestressed concrete components to suit minor road bridge applications from 2 m to 21 m.

### Precast arches

Humes' precast arch system is unparalleled as a high performance and cost effective bridge solution with excellent visual appeal. The arch units are ideal for a wide variety of bridge structures, offering a span of 6 m to 21 m, and heights to 9 m. There are four different types available to meet design requirements:

1. The one piece arch – for spans up to 12 m and heights of 4 m.
2. The two piece arch – ideal solution for larger envelopes with spans from 15 m to 21 m, and heights up to 7.5 m.
3. The 3-pin arch – ideal for tunnels with heavy and complex loadings, or for a variety of internal clearance criteria.
4. The top arch – designed with a flatter arc and a larger radius to accommodate stringent clearance requirements and provide a viable alternative to beam and slab solutions.

The type of arch required for each project depends on required span, envelope, transportability of the units, and the loadings imposed on the structure.

The arch system typically includes an arch unit, a spandrel wall, and a wing wall.

The spandrel walls run parallel to the arch, retaining the backfill at each end of the structure and enhancing its appearance. Units range from 6 m to 21 m span.

The wing walls are placed at each end of the spandrel wall to retain the backfill, support the spandrel walls, and provide retaining walls. Wing wall orientation can be designed to suit site specific requirements. Each wing wall unit is approximately 2.5 m wide.

Humes also offers a bevelled end solution as an alternative to the spandrel and wing wall arrangement.

All of these elements may be finished in either conventional concrete or a variety of finishes to suit the design requirements.



The Humes precast arch system is a superior solution, offering our customers:

- design versatility – several arch types can be customised to suit almost all clearance envelope requirements. Multiple cell arches can easily accommodate design requirements including sloped sites, curved pathways, rail impact, and skylight openings. Precast spandrel walls and wing walls are available to provide a complete arch solution.
- fast installation – Humes' precast arches are fast and easy to assemble without the need for formwork. Simple strip footings are suitable for the arch. Arches are free standing so require no scaffolding for erection.
- impressive durability – the combination of backfill and overfill protects the arch element. All arches are designed for a 100 year life in accordance with Australian Standard – Bridge Design (AS 5100 – 2004).
- minimal maintenance – the system provides a continuous pavement (no joints) for overpasses which means asset owners avoid the cost and inconvenience of bridge deck maintenance and repairs to support bearing or expansion joints. The use of high strength concrete manufactured under tight quality systems also ensures minimal inspection requirements throughout the life of the structure.
- great aesthetic value – arches have a graceful appearance, and a wide range of surface treatments are available to further enhance their design.
- no differential settlement – precast arches don't need approach slabs to prevent differential settlement at the abutments.

Top:  
Triple cell one piece  
arch installation

### Architectural finishes

Right:  
Examples of  
architectural  
finishes

The Humes' range of finishes transforms a concrete structure into an architectural solution. The product range encompasses simple traditional brick, stone textured patterns, or sophisticated custom artwork. The Humes range of finishes will enhance the appearance of any concrete infrastructure project.



## HumeDeck® system

The HumeDeck® modular bridge system is the perfect solution for small to medium size bridges, both for new bridges, and the upgrade of many of Australia's older small bridges.

It can be installed onto an existing substructure, or combined with precast concrete piles, abutments and headstocks for a total precast solution.

The HumeDeck® system is a cost effective decking system with low design costs, quick installation and minimal maintenance:

- The deck and girder are combined into one unit to enable an efficient design and fast and simple installation. The combined deck and girder unit provides a span from 6 m to 12 m.
- Headstock and abutments are either joined to piles or bolted to existing piers for faster installation.
- Minimal longitudinal joints reduce installation time and maintenance requirements.
- It is cheaper to transport and handle because the units are wide but lighter in mass than other products.
- There is less site work as post tensioning of units is not necessary.
- The top surface of the HumeDeck® units have a coarse broom finish which can be used as the road surface without the need for additional concrete topping or asphalt surfacing.
- Humes provide a complete precast bridge solution including substructure components like abutments, headstocks, and piles.

The standard HumeDeck® bridge system is manufactured to a 100 year life, in accordance with the Australian Standard – Bridge Design (AS 5100 – 2004), however we can design in accordance with other load cases if required. Bridge units can be designed to meet site specific parameters and tolerances and can also incorporate cast-in fittings for the connection of different types and class of barriers. Kerbs can be precast integrally with the HumeDeck® units or manufactured as separate precast units and bolted to the deck units on site.



Left:  
A complete HumeDeck® modular bridge system installation including deck units, precast piles, abutment and headstocks

## Case study



### MacArthur Gardens, Sydney

Humes provided a HumeDeck® modular bridge system with fewer individual parts than the original specification. It included 15 deck units (each 12 metres in length), two head stocks and two abutments, along with 12 six metre lengths of concrete barrier.

Top:  
Multiple cell box  
culvert installation  
with Linkslab® units

## Box culverts

Box culverts are an ideal solution for instant bridging. Humes precast concrete box culverts suit difficult site conditions as installation requires minimal excavation and backfill. They are designed to tolerate heavy wheel loads even with no or minimal overfill in place.

Humes manufactures a full range of box culverts (from 300 mm to 6,600 mm span) and configurations to Australian Standards AS 1597 (parts one and two). Box culverts are generally available in standard lengths of 1.2 m and 2.4 m but can be manufactured in custom designs such as splayed units. Penetrations, post tensioning ducts, openings and cast-in items such as ferrules can be easily accommodated in the design of box culverts.

The box culvert is available either as an inverted U on a concrete base foundation (crown type) or as a U shaped trough with a lid (invert type). Humes designs and supplies precast bases and lids to suit individual box culverts.

Placing two or more box culverts together forms a multiple cell installation. Placing a Linkslab® unit between two culverts is a cost effective solution for installations of three cells and above. It also reduces the number of supports which increases the waterway width. A Linkslab® unit usually has the same span as the supporting box culvert but Humes can design a span with a greater width than the crown unit. When depth of fill is minimal, a Linkslab® unit can be designed to sit flush with the top of the crown unit.

## Uniculvert® modules

Humes manufacture Uniculvert® modules where the crown and the base slab are cast integrally minimising site work and construction time.



## Prestressed decks and girders

Humes manufactures a wide range of prestressed bridge componentry including girders, decks, planks, I-Beams, hexagonal prestressed piles, and parapets.

Humes' prestressed items are suitable for major bridge and wharf infrastructure through to minor infrastructure works. Our in-house engineering team can design non-standard items.

Humes is an accredited manufacturer of prestressed structures for road and rail authorities, including a range of decks and planks (up to 25 m), Super-T girders/T-Roffs (up to 38 m), and I-Beams.



### HumeSlab® bridge decking

The HumeSlab® system is a unique formwork solution that combines precast concrete panels with an in-situ concrete topping.

The HumeSlab® panel forms the bottom portion of the slab and the platform for the deck above – a cost effective way to maintain the structural integrity of a monolithic slab.

The HumeSlab® system is ideal for heavy duty bridge decks and localised load areas as it easily accommodates varied designs, shapes, thicknesses, penetrations and cast-in fittings.

The precast concrete panels are between 55 mm and 100 mm thick and incorporate the bottom steel of the slab with specially designed steel trusses to increase spans between temporary props. Panels are generally limited to 12 m in length for easier transport.

### HumeSpan™ permanent formwork

The HumeSpan™ system is an extremely lightweight slab solution for new and retrofitted commercial applications. This simple variation on the HumeSlab® system is generally made with lightweight concrete and polystyrene void formers, to provide a fast and cost effective approach to constructing concrete slabs.

The HumeSpan™ system consists of concrete beams 230 mm wide x 50 mm thick, fitted with a standard HumeSlab® truss separated by a polystyrene tee block. Dimension details vary depending on the specific applications and designs required.

Top:  
HumeSlab® bridge  
decking



Right:  
Steel reinforced  
concrete pipes

## Steel reinforced concrete pipes

Humes stormwater pipes and headwalls are an ideal solution for road crossings over waterways with minimal backfill requirements. Humes reinforced concrete pipes are available from DN225 to DN3600 in standard strength (Class 2-4) and super strength (Class 6-10) load classes.





## Highway bridges

Humes offers a range of precast and prestressed concrete components to suit highway bridge applications from 2 m to 35 m.

### Precast arches

Humes' precast arch system is unparalleled as a high performance and cost effective bridge solution with excellent visual appeal.

The arch units are ideal for a wide variety of bridge structures, offering a span of 6 m to 21 m, and heights to 7.5 m.

See page 32 for more information.

### Case study



#### Ballina Bypass, NSW

When Humes won the tender to supply three arch structures for the Ballina Bypass, its engineers took on some major design challenges - a steep gradient of 13.5 degrees, soil movement of 50 mm, asymmetrical loadings, and the tightest centerline radius on an arch ever built in Australia.

Top:  
Precast arch  
structure



Top:  
Prestressed girders

## Box culverts

Box culverts are an ideal solution for instant bridging. Humes precast concrete box culverts suit difficult site conditions as installation requires minimal excavation and backfill. They are designed to tolerate heavy wheel loads even with no or minimal overfill in place.

Humes manufactures a full range of box culverts (from 300 mm to 6,600 mm span) and configurations to Australian Standards AS 1597 (parts one and two). Box culverts are generally available in standard lengths of 1.2 m and 2.4 m but can be manufactured in custom designs such as splayed units.

See page 36 for more information.

## Uniculvert® modules

Humes manufacture Uniculvert® modules where the crown and the base slab are cast integrally minimising site work and construction time.

## Prestressed decks and girders

Humes manufactures a wide range of prestressed bridge componentry including girders, decks, planks, I-Beams, and hexagonal prestressed piles.

Humes' prestressed items are suitable for major bridge infrastructure. Our in-house engineering team can design non-standard items.

Humes is an accredited manufacturer of prestressed structures for road and rail authorities, including a range of decks and planks (up to 25 m), Super-T girders/T-Roffs (up to 35 m), and I-Beams.

A cathodic protection system can be encased, especially in tidal splash zones, to ensure long service life.

## HumeSlab® bridge decking

The HumeSlab® system is ideal for heavy duty bridge decks and localised load areas as it easily accommodates varied designs, shapes, thicknesses, penetrations and cast-in fittings.

See page 37 for more information.

## Steel reinforced concrete pipes

Humes stormwater pipes and headwalls are an ideal solution for highway crossings over waterways with minimal backfill requirements. Humes reinforced concrete pipes are available from DN225 to DN3600 in standard strength (Class 2-4) and super strength (Class 6-10) load classes.

## Case study



### AirportLinkM7, Brisbane

HumeSlab® bridge decking demonstrated its adaptability by catering to complex curves and non-standard shapes for three cantilever bridges in Brisbane's AirportLinkM7 project.



# Rail bridges

Top:  
Uniculvert®  
modules

Humes offers a range of precast and prestressed concrete components to suit rail bridge applications from 2 m to 35 m.

## Precast arches

Humes' precast arch system is unparalleled as a high performance and cost effective rail bridge solution with excellent visual appeal.

The arch units are ideal for a wide variety of bridge structures, offering a span of 6 m to 21 m, and heights to 7.5 m.

See page 32 for more information.

## Box culverts

Box culverts are an ideal solution for rail bridges. Humes precast concrete box culverts suit difficult site conditions as installation requires minimal excavation and backfill.

Humes manufactures a full range of box culverts (from 300 mm to 6,600 mm span) and configurations to Australian Standards AS 1597 (parts one and two). Box culverts are generally available in standard lengths of 1.2 m and 2.4 m but can be manufactured in custom designs such as splayed units.

See page 36 for more information.

## Uniculvert® modules

Humes manufacture Uniculvert® modules where the crown and the base slab are cast integrally minimising site work and construction time.

## Prestressed decks and girders

Humes manufactures a wide range of prestressed bridge componentry including girders, decks, planks, I-Beams, and hexagonal prestressed piles.

Humes' prestressed items are suitable for major bridges through to minor infrastructure works. Our in-house engineering team can design non-standard items.

Humes is an accredited manufacturer of prestressed structures for road and rail authorities, including a range of decks and planks (up to 25 m), Super-T girders/T-Roffs (up to 35 m), and I-Beams.

A cathodic protection system can be encased, especially in tidal splash zones, to ensure long service life.

## HumeSlab® bridge decking

The HumeSlab® system is ideal for heavy duty bridge decks and localised load areas as it easily accommodates varied designs, shapes, thicknesses, penetrations and cast-in fittings.

See page 37 for more information.

## Steel reinforced concrete pipes

Humes stormwater pipes and headwalls are an ideal solution for railway crossings over waterways with minimal backfill requirements. Humes reinforced concrete pipes are available from DN225 to DN3600 in standard strength (Class 2-4) and super strength (Class 6-10) load classes.

## Case study



### St Lawrence Creek Rail Bridge, QLD

When Queensland Rail undertook a \$28m upgrade of the St Lawrence Creek Rail Bridge, they were committed to implementing a long term, durable, and cost effective solution. Humes was subsequently chosen to supply 80 x 25 metre prestressed girders with encased cathodic protection.

# Wharf structures

Humes' prestressed solutions have been widely used for deck construction on major wharf structures. The componentry is easily installed, durable and cost effective.

## Prestressed decks and girders

Bottom:  
Prestressed decks  
used in a wharf  
application

Opposite page:  
Precast arches

Humes manufactures a wide range of prestressed bridge componentry including girders, decks, planks, I-Beams, and hexagonal prestressed piles.

Humes' prestressed items are suitable for major bridge and wharf infrastructure through to minor infrastructure works. Our in-house engineering team can design non-standard items.

Humes is an accredited manufacturer of prestressed structures for road and rail authorities, including a range of decks and planks (up to 25 m), Super-T girders/T-Roffs (up to 35 m), and I-Beams.

A cathodic protection system can be encased, especially in tidal splash zones, to ensure long service life.

## HumeSlab® bridge decking

The HumeSlab® system is ideal for heavy duty bridge decks and localised load areas as it easily accommodates varied designs, shapes, thicknesses, penetrations and cast-in fittings.

See page 37 for more information.

## HumeDeck® system

The HumeDeck® modular bridge system is a cost effective decking system that can be installed onto an existing substructure, or combined with precast concrete piles, abutments and headstocks for a total precast solution.

See page 35 for more information.





## Pedestrian crossings

The design flexibility and aesthetic appeal of Humes' structural precast components make them a perfect solution for pedestrian and cyclist crossings.

### Precast arches

Humes' precast arch system is unparalleled as a high performance and cost effective bridge solution. Its visual appeal makes it a preferred pedestrian structure in recreation parks and residential complexes.

The precast arch is ideal for a wide variety of pedestrian bridge structures, spanning 6 m to 12 m.

See page 32 for more information.



## HumeDeck® system

Top:  
HumeDeck® bridge  
system

Bottom:  
Prestressed girders  
in a pedestrian  
bridge application

The HumeDeck® modular bridge system is the perfect solution for small to medium size bridges, both for new bridges and bridge replacement projects. It is ideal for pedestrian crossings over highways and motorways, and the construction of access ramps for cyclists and disabled persons.

See page 35 for more information.

## HumeSlab® bridge decking

The HumeSlab® system is ideal for pedestrian crossings as it easily accommodates varied designs, shapes, thicknesses, penetrations and cast-in fittings.

See page 37 for more information.

## Prestressed decks and girders

Humes manufactures a wide range of prestressed bridge componentry including girders, decks, planks, I-Beams, and hexagonal prestressed piles.

Humes' prestressed items, especially the Super -T girder, are suitable for pedestrian bridges and cyclist routes along motorways and river banks. Our in-house engineering team can design non-standard items.

Humes is an accredited manufacturer of prestressed structures for road and rail authorities, including a range of decks and planks (up to 25 m), Super-T girders/T-Roffs (up to 35 m), and I-Beams.



## Box culverts

Box culverts are an ideal solution for instant bridging. The Humes range of large box culverts (from 3 m wide and 3 m high up to 6 m wide and 6 m high), has been widely used for pedestrian underpass access, pedestrian platforms over railways, and for constructing underground access in recreational areas.

See page 36 for more information.

## Uniculvert® modules

Humes manufacture Uniculvert® modules where the crown and the base slab are cast integrally minimising site work and construction time.



## Steel reinforced concrete pipes

Humes offers a wide range of diameters, lengths and classes of reinforced concrete pipes which are suitable for pedestrian crossing applications. Humes large reinforced concrete pipes from DN2400 are an alternative solution for pedestrian crossings under road and rail lines. Humes SRCP is available up to DN3600 in standard strength (class 2-4).

Left:  
Splayed box  
culverts used as a  
pedestrian walkway

# 5. Tunnel and shaft solutions

Humes offers a complete range of tunnel and shaft solutions including segment-based systems, precast arches, jacking pipes and large box culverts.





# Access, pipe jacking and ventilation shafts

Humes has developed a competitive range of underground shafts for use in the civil, mining and urban utility sectors.

## Segmental shafts

Segmental shafts are a viable alternative to the traditional techniques used in Australia for the construction of permanent and temporary shafts. With a unique segment design, the Humes systems provide great flexibility, impressive construction efficiencies and a safer method to construct below ground chambers.

Humes offer two types of segmental shafts; the caisson and underpin, which suit most soil conditions and installation methods.

The caisson method is suitable for soft soil conditions, where the shaft can be constructed above ground and pushed down from the surface using jacking force.

The underpin method maintains the same strength and benefits of the caisson method but is more suitable for hard soil conditions where shaft jacking is not feasible.

Segmental shafts are available in standard sizes of 4.5 m, 6 m, 7.5 m, 9 m, 12.5 m, and 15 m diameters. Larger sizes can be manufactured if required.

## One piece shafts

The Humes range of standard one piece caisson units suits fast and simple construction of small diameter shafts. The units bolt together vertically, complete with seals, to form a finished shaft, and can be custom designed if required.

One piece caisson shafts are available in standard 3 m and 3.6 m (internal) diameters of 1 m to 2.4 m depths. Shafts have a steel cutting edge and are available with HDPE or PVC linings. Precast roof slabs are also available.

## Case study



### Sydney's Desalination Pipeline Project

Humes supplied segmental shaft linings for construction of two temporary pipe jacking shafts for the project. The shafts were installed using the caisson method which involves jacking the concrete segments into the ground to form the shaft structure.



# Mine portals and reclaim tunnels

Humes offers a range of precast concrete tunnel and shaft solutions specifically for the mining sector with products designed to deliver environmental, safety and economic value to our clients.

## Precast arches

The precast arch system is unparalleled as a high performance and cost effective tunnel solution. Humes has developed a large range of custom designed arches that are ideal for a variety of complex heavy loading criteria and internal envelopes.

The 3-pin arch range has been widely used for reclaim tunnels in mining applications, catering for coal and other mineral stockpiles up to 25 m.

The concrete arch is designed to meet the mine's designated design life, and requires minimal maintenance. Conveyor belts are easily attached to the internal soffit of the arch, and precast concrete feeder chambers are also available to fit intake valves.

## Box culverts

Humes manufactures extra large spanned box culverts for safe access to mine and construction sites and as conveyer tunnels, with spans and leg heights up to 6 m. Prestressed units and post-tensioning are also available to gain additional strength.

Our design team can customise culvert designs to suit various applications and site conditions.



Left:  
3-pin arch reclaim  
tunnel

Right:  
Box culvert mine  
portal



## Traffic and utility tunnels

Humes has a range of cost effective solutions for micro-tunnelling applications and segmental tunnel linings for deep applications and long tunnels.

### Segmental tunnel linings

Segmental linings are commonly used to construct utility tunnels, rail transport tunnels, water pipelines, and desalination structures. Humes' trapezoidal segments use the latest technology to deliver a smooth bore, single pass tunnel, which can withstand the increasing demands of modern tunnel boring machines and poor ground conditions.

Humes cast these segmental linings from 2 m to 3.84 m diameters (internal), although other sizes may be available on request. Humes tunnel linings are a complete system with:

- cost effective installation
- three segment types for curved or straight construction (curved alignments are easily accommodated by altering the ring orientation)

- minimum finishing
- one-pass finish for permanent structures
- factory controlled quality concrete moulds ensuring a consistent accuracy of segment dimensions
- segments designed to be machine handled with a rotating arm erector
- segments provided with a fast coarse thread plastic socket at the centroid for lifting and grouting
- non-ferrous self-locking, self-aligning connectors reduce internal bolt recesses
- the elimination of cruciform joints.

## Box culverts

Humes' range of box culverts, with spans from 300 mm up to 6,600 mm, are an ideal solution for traffic and utility tunnels.

See page 34 for more information.

## Steel reinforced concrete pipes – jacking

Humes has a comprehensive range of steel reinforced jacking pipes to suit a variety of applications and installation methods. Standard Humes' jacking pipes are available from DN300 to DN3600 in class 4.

- Butt joint jacking pipes – a cost effective solution for typical short length applications where high flexibility and a soil or watertight joint is not required. Available in DN300 to DN3000 in 2.4 m lengths.
- In-wall joint jacking pipes – a cost effective solution for typical short length applications needing a flexible watertight joint. Available in DN1200 to DN3600 in 2.4 m and 3 m lengths.
- S series jacking pipes – provide high axial load transfer capacity and a flexible watertight joint. Available in DN300 to DN700 in 2.4 m lengths.
- J series jacking pipes – provide high axial load transfer capacity and a flexible watertight joint (including the interjack pipes). Available in DN800 to DN2100 in 2.4 m and 3 m lengths.

## Case study



### CLEM7 Tunnel, Brisbane

Humes applied its expertise in the manufacture of precast box culverts for one of the largest infrastructure projects ever to be undertaken in Queensland. Over 3,700 custom-made box culverts with tapered legs were supplied to create the service duct for the 6.8km long tunnel.



Left:  
J series jacking pipe  
installation

Opposite page:  
Segmental tunnel  
linings in a utility  
tunnel application





## Escape tunnels and shafts

Humes offers a range of solutions which are designed to provide safe egress and withstand heavy loads

### Precast arches

Top:  
Precast arches in a  
mine escape tunnel  
application

The precast arch system is unparalleled as a high performance and cost effective tunnel solution. Humes has developed a large range of custom designed arches that are ideal for a variety of complex heavy loading criteria and internal envelopes.

See page 32 for more information.

## Box culverts

Humes manufactures extra large spanned box culverts (up to 6 m span and 6 m height) for escape tunnels on mine and construction sites, and as conveyer tunnels. Prestressed units and post-tensioning are also available to gain additional strength.

Our design team can customise culvert designs to suit various applications and site conditions.

## Steel reinforced concrete pipes

Large diameter reinforced concrete pipes (DN2500 to DN3500) are an ideal solution for escape tunnels where heavy loads will be imposed.

## Segmental shafts

Segmental shafts are a viable alternative to the traditional techniques used in Australia for the construction of permanent and temporary shafts. With a unique segment design, the Humes systems provide great flexibility, impressive construction efficiencies and a safer method to construct below ground chambers.

Humes offer two types of segmental shafts; the caisson and underpin, which suit most soil conditions and installation methods.

The caisson method is suitable for soft soil conditions, where the shaft can be constructed above ground and pushed down from the surface using jacking force.

The underpin method maintains the same strength and benefits of the caisson method but is more suitable for hard soil conditions where shaft jacking is not feasible.

Segmental shafts are available in standard sizes of 4.5 m, 6 m, 7.5 m, 9 m, 12.5 m, and 15 m diameters. Larger sizes can be manufactured if required.

# 6. Walling solutions

The Humes range of earth retaining, storage walls and functional/decorative panels suits a variety of applications, environments and budgets. Our wall solutions are available in many sizes, shapes, colours and finishes to meet the needs of any project.



# Earth retaining walls

Humes provides wing wall solutions for small to large scale applications.

## Wing walls

Precast concrete wing walls retain earth fill and support the spandrel wall/headwall on arch and box culvert installations. Further wing walls can be added to retain earth fill and direct water flow. Wing walls are provided with weep holes to relieve hydrostatic pressure.

Humes manufacture two types of wing walls; the light type shaped like an inverted T and the heavy type shaped like an L.



Left:  
Heavy type wing  
walls on a precast  
arch structure

# Wall panels

Humes' precast panels are an ideal solution for facades and retaining walls where tight tolerances, innovative design and quality workmanship are critical.

## Functional and decorative panels

The design and installation benefits of the Humes panels make them a competitive solution for road applications such as sound barriers along motorways and in underground tunnels.

Precast panels are available in a wide range of sizes, shapes, colours and finishes to provide a quality solution for any project. Our experienced team of structural and civil engineers can design a customised panel to suit your requirements.

## Architectural finishes

The Humes' range of finishes transforms a concrete structure into an architectural solution. The product range encompasses simple traditional brick, stone textured patterns, or sophisticated custom artwork. The Humes range of finishes will enhance the appearance of any concrete infrastructure project.



# Storage walls

Humes supply storage wall solutions for all types of bulk materials, with a range of temporary, permanent, standard and custom made options.

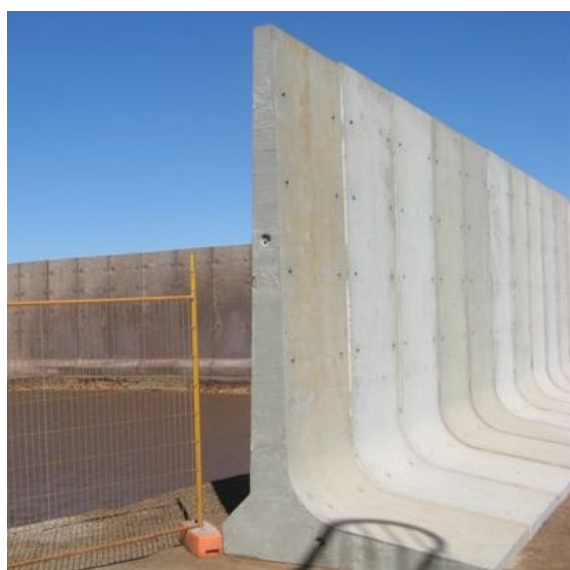
## L and T walls

Humes manufactures modular cantilever storage wall units for retaining, separating and confining all types of bulk materials. Walls can be temporary or permanent and can be used for internal and external storage areas. The Humes storage wall units are a simple, safe reinforced concrete storage system with long service life and minimal maintenance.

Humes manufactures two systems; the L wall and the T wall. Standard L wall units are normally used for single loading applications where materials are stored on the heel side of the wall only. Standard T wall units are normally used for double loading where materials are stored on both sides of the wall.

Both L and T walls can also be used in earth retaining applications especially with arch applications.

Special purpose wall units can also be manufactured to meet client requirements, including customised shapes or modifications to the standard unit height.



## Grain bunker modules

Humes' precast concrete grain bunker modules have been specifically designed to store grain in stockpile situations and provide a number of benefits:

- Horizontal grooves allow clamping of tarpaulins for protection from vermin and the weather.
- The versatile design suits both indoor or outdoor applications.
- The simple design allows for fast and easy assembly and dismantling.
- There are no limitations in the length or shape of a storage area.
- They increase the capacity of a storage area compared to open stacks.
- Lifting lugs enable easy handling.
- Uniformity of structure enhances the appearance of storage areas.

Standard modules are 900 mm high and 3,500 mm long.

Bottom:  
L wall units

Opposite page:  
Wall panels with  
custom finish



# 7. Potable water supply solutions

Humes provides a comprehensive range of steel reinforced concrete pressure pipes which are designed for the combined effects of external load and internal (in service) pressure.



## Steel reinforced concrete pipes – trench

Humes offers a comprehensive range of steel reinforced concrete pressure pipes in DN300 to DN3600. These pipes can be manufactured with bends, reducers, and cast-in mild steel, cast iron or plastic fittings.

Reinforced concrete pressure pipes are designed for the combined effects of external load and internal (in service) pressure. Australian/New Zealand Standard AS/NZS 4058: 2007 Precast Concrete Pipes (Pressure and Non-Pressure) gives a minimum requirement for factory test pressure of 120% of working pressure in the pipeline.

Rubber ring jointed (RRJ) pipes are recommended for all concrete pressure pipe applications. RRJ pipes up to DN1800 are supplied with a belled socket joint, while those larger than DN1800 are supplied with an in-wall joint.

## Steel reinforced concrete pipes – jacking

Humes has a comprehensive range of steel reinforced jacking pipes to suit a variety of applications and installation methods. Standard Humes jacking pipes are available from DN300 to DN3600 in class 4.

- S series jacking pipes – provide high axial load transfer capacity and a flexible watertight joint. Available in DN300 to DN700 in 2.4 m lengths.
- J series jacking pipes – provide high axial load transfer capacity and a flexible watertight joint (including the interjack pipes). Available in DN800 to DN2100 in 2.4 m and 3 m lengths.
- In-wall joint jacking pipes – a cost effective solution for typical short length applications needing a flexible watertight joint. Available in DN1200 to DN3600 in 2.4 m and 3 m lengths.



Top:  
Rubber ring jointed  
pressures pipes

Bottom:  
S series jacking  
pipes shown with  
timber joint packers

## Case study



### Northern Pipeline Interconnector, SEQ

J series jacking pipes played an integral role in the successful completion of a record breaking 1,032 m pipe-jack, which also involved a height difference of 60 m from the launch position to the final target, and the design requirement for a significant vertical curve.



# 8. Irrigation and rural solutions

Humes delivers cost effective and robust solutions for a variety of irrigation and rural needs.



# Irrigation supply

Humes provide irrigation supply solutions to enhance water conservation efforts throughout rural Australia. We have worked closely with landholders and engineers to improve the design and efficiency of their irrigation systems.

## Steel reinforced concrete pipes – trench

Rubber ring jointed pipes are recommended for irrigation applications where a pressure tight joint seal is required. Humes steel reinforced concrete irrigation pipes are available in two joint options; a belled socket joint for DN300 to DN1800 pipes, and an in-wall joint for pipes up to DN3600 (to accommodate the greater pipe wall thickness). While these joints are watertight they can provide a small amount of deflection, without compromising the joint integrity. Humes pipes can receive up to a 90 kPa pressure rating within their joint and pipe barrel.

The inherent strength and durability of Humes' concrete pipes makes them a long term asset for any land holder, with a virtually unlimited service life for most common installations.

Most irrigation pipes need to be of high strength and Humes frequently manufactures non-standard class pipes to satisfy the requirements of specific projects. Pipelines under large embankments can range from class 2 to class 10.



Left:  
Irrigation headwall  
with control gate

## Irrigation headwalls

Irrigation headwalls are used to divert and channel water in and out of pipelines. Due to the varying structures required within the irrigation market, Humes has developed a bolt-together headwall system which allows for great variation in headwall sizing. Sloping headwalls and end walls are also available in some regions. The versatility of Humes' headwall system is demonstrated by the easy reconfiguration of the standard layout.

For projects with specific needs, our design team can work with you to produce a dedicated headwall design providing a cost effective solution.

## Floodgates

Top:  
Bolt-on style  
floodgate

Middle:  
Channel check

Bottom:  
Mann irrigation pit

The Hume-King floodgate is an end-of-line, non-return valve which protects a pipeline from tidal inundation, the entry of debris, animals and vermin, and backflow. Hume-King floodgates benefit pipeline management through:

- high chemical resistance (to organic solvents, acids, alkalis, and salt water) which delivers a non-corrosive, durable pipeline solution
- UV resistance, ensuring they will not warp in service
- manufacture from materials with low salvage value, discouraging theft and vandalism.

Hume-King floodgates are moulded from fibreglass reinforced polyester, with high tensile 316 stainless steel built-in hinges, and replaceable neoprene sealing rings. They are available to suit Humes standard pipe diameters. Humes can develop and manufacture customised floodgates for non-standard applications.



## Channel checks

A channel check enables irrigators to regulate or stop the flow of an irrigation channel. As a bolt-on system, these units can be installed in a variety of configurations.



## Drop boxes

A drop box enables irrigators to move water from tail water return drains into channels and then to on-farm storage. Humes can manufacture these units to suit any project, with varying heights, and placement of side voids to accommodate pipelines from any angle.



## Mann irrigation pits

Mann irrigation pits are designed to house electromagnetic meters which monitor the flow of water in an irrigation system. The accurate measurement of water flow is achieved by combining specially designed inlet and outlet structures, connecting pipes and an electromagnetic meter. The meter and outlet control door are powered by solar panels, which allows multiple systems to be controlled from a central location.

# Troughs

Humes manufactures a range of trough shapes, sizes and accessories for watering sheep and cattle.

The Humes stock troughs provide many benefits to landholders:

- 50 MPa concrete gives the trough an extremely tough and durable composition
- 500 MPa N-class steel reinforcement gives the trough additional strength and durability to sustain bumps or weathering
- weight of the trough eliminates the need for anchoring, ensuring simple and secure placement
- concrete is UV and heat resistant, keeping water cooler in high temperatures.

The range includes an interlocking feedlot trough design to enable continuous troughing to suit a variety of feedlot layouts.

Humes can also supply a large range of brass fittings, trough valves and floats.



Left:  
Roundline cattle trough

Top:  
Squareline cattle trough

Bottom:  
Longline cattle trough



# 9. Traffic management solutions

Humes' selection of easy-to-install precast concrete barrier systems can simplify temporary or permanent traffic management issues. Our barrier solutions are manufactured to local road authority specifications.



## Barriers

Humes manufactures precast concrete jersey kerb barriers to suit the specifications of local road authorities. The units are available in single or double sided configurations in standard 3 m and 6 m lengths, and can be supplied with tapered ends.

## Wheel stops

Humes wheel stops are an economical and durable solution for traffic management in parking facilities. They are secured with two steel spikes with no concreting required which allows for easy relocation if necessary. Standard units are 2 m long by 125 mm high with rebates on the base to allow for drainage.

## Case study



### Formula 1™ Qantas Australian Grand Prix

Humes worked closely with the APP Corporation to deliver new safety barriers while meeting tight project timeframes and maintaining a professional standard for the course. The client was so impressed with the result that a second purchase order was made to upgrade existing stock.



Left:  
Jersey kerb barriers

Right:  
Wheel stops

# 10. Cable and power management solutions

Humes offers a range of precast cable pits and other products to meet the needs of the communications and energy sectors.



### Cable jointing access chambers

These chambers allow workers to enter the unit for cable installation and maintenance. There are three models available varying in size from 1,610 mm to 4,365 mm long, 1,260 mm to 1,560 mm wide, and 1,058 mm to 1,864 mm high.



Top:  
Cable jointing access chamber

Middle:  
J9 model cable jointing pit

Bottom:  
Costello pit

### Cable jointing pits

These pits permit cable jointing to be carried out externally. There are two pit models available; the J8 which measures 1,429 mm long, 619 mm wide, and 948 mm high, or the J9 model which measures 2,250 mm long, 710 mm wide and 975 mm high.

### Costello pits

These circular precast shafts have a precast base and knockouts for the jointing of cables. Shaft and base sections can be manufactured with pre-formed blockout locations for more efficient installation.

Costello pits are supplied in DN1050, DN1200, and DN1500 and come in different heights, with risers to suit local requirements. Costello pits are approved by Rail Corporation NSW (RailCorp).





## Light pole bases

Humes' precast light pole bases deliver great savings for projects by reducing installation times, labour costs, waste and cleanup, and removing the need for formwork. The square bases are manufactured in three standard types that can be adjusted to suit most project requirements.

The light pole bases are placed in the ground to support and resist the forces produced by the column/post/shaft and can be used for both main roads or minor roads (residential/estates). Humes bases have been designed and developed in collaboration with Energex (a local energy authority) and tests conducted during the development showed high resistance to design loads.

The base length (depth in ground) can be modified to suit a range of light pole sizes and applications. The light pole and base are connected through a plate that can be bolted to the concrete base via cast-in ferrules. The maximum mounting height depends on the base size and increases for larger columns. The 350 mm by 350 mm square bases vary in length depending on the intended use. Standard lengths are 975 mm and 2,150 mm.

Conduits can be cast into the light pole bases to provide a clear path for electrical cables. The bases come with foot anchors for safe and easy transportation and installation.



Left:  
Light pole bases

Right:  
Pad-mounted  
Uniculvert® module

Opposite page:  
Oil separator

## Pad-mounted Uniculvert® modules

Humes manufactures a standard pad-mounted Uniculvert® module which is designed to house and support a transformer box. The Uniculvert® box has been designed in collaboration with Energex (a local energy authority) to adequately house electrical cables, and provide a solid mount for the electrical transformer. It has removable side panels that are erected during installation to house the electrical cables.

The standard Uniculvert® module is 1,400 mm long, 1,400 mm wide and 1,080 mm high. An optional base pad (2,000 mm by 1,700 mm) can be supplied to support the structure when required.





## Oil separators

Humes manufactures a range of oil separation tanks which are designed to capture oil in the event of a transformer or substation failure, and prevent its release into the environment.

The tanks capture flows from banded areas and contain the waste material until it can be removed by a licensed waste transporter.

Tank sizes are usually DN1950 or DN2400 of varying lengths (oil holding capacity).

# 11. Rail solutions

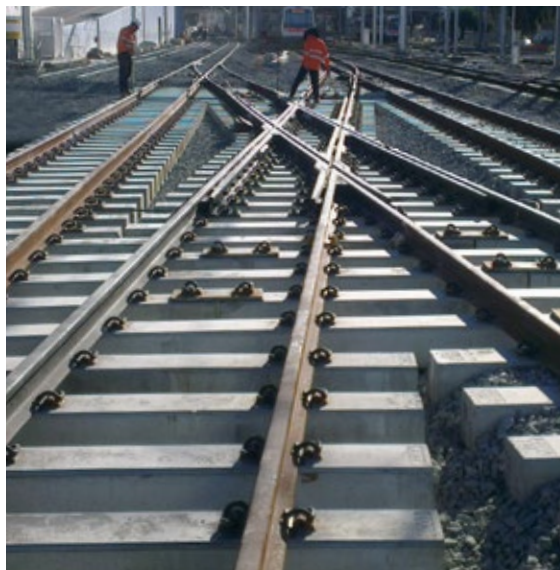
Humes has been manufacturing concrete sleepers and rail components since 1958, and has supplied some of Australia's major rail infrastructure projects.



## Turnout bearers

Humes can manufacture a wide range of turnout bearers, including conventional flat and canted, tangential, diamond, crossover, scissor, single and double slip, dual gauge, catchpoint, flangeway running bearers and concrete cant reducing bearers.

Each set of turnout bearers are made to a unique design provided by the client. The number of bearers in each set varies widely - some sets may only have 10 bearers while others may have as many as 130 bearers.



Top:  
Turnout bearers

Middle:  
Crossing panels

Bottom:  
Ballast kerbs  
attached to box  
culvert rail bridge

## Sleepers

Humes has over 50 years experience in the provision of prestressed and precast concrete railway sleepers for heavy haulage, mainline, secondary and high speed tracks across Australia. We provide a range of standard, dual and narrow gauge sleepers for applications including grain, electrical, transponder, pedestrian, transition and DED sleepers.



## Crossing panels

Humes can supply level crossing panels to suit standard and narrow gauge tracks. Crossing panels are suitable only for low volume and low speed applications such as access tracks and rail yards where traffic is required to stop prior to proceeding over the crossing. These products are not recommended for use on public roads.

Crossing panels are supplied in 1,820 mm length modules which can be assembled to the length required. Each module consists of one inner panel and two outer panels.



## Ballast kerbs

Ballast kerbs are designed to retain the ballast from falling off the edge of box culverts once the rail line is installed. They measure 150 mm thick with a height of either 450 mm or 600 mm and a length to suit the box culvert. The ballast kerb also includes voids at the base for drainage and cast in holes for bolting to kerb brackets.



# Our business



# Our history

Humes reached a significant milestone in November 2010, marking 100 years since entrepreneur Walter Hume invented his revolutionary method of making concrete pipes. His process, using centrifugal spinning, transformed the pipe manufacturing industry worldwide, and formed the foundation of the Humes business.

The Humes concrete pipe was a huge leap forward for Australia's urbanisation. It replaced the poor-quality hand-made pipes available at the time with a stronger, cheaper, more durable and reliable product for water supply, sewerage and drainage systems.

The Humes name soon spread overseas, and Walter began exporting his innovations around the world at a time when most other Australian companies were importing technology.

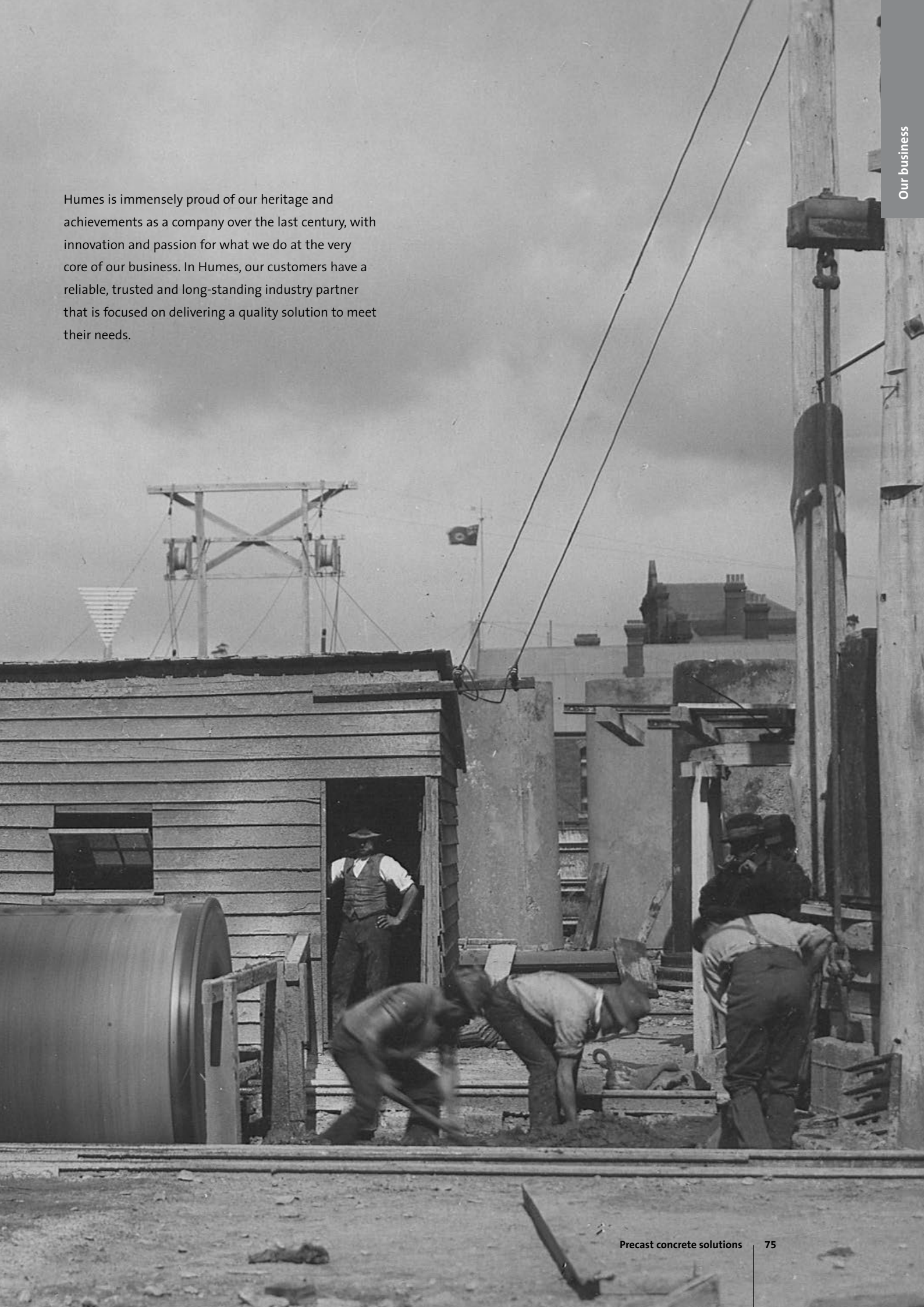
Humes has come a long way since those early days of 1910. Today we manufacture over 500,000 tonnes of precast concrete products annually. We have a presence in every state in Australia, with 12 manufacturing facilities and sales offices nationwide.

Humes has been the supplier of choice for many of Australia's largest infrastructure projects, beginning with the installation of sewer and water pipes in Australia's major cities in the early 20th Century.

While the principle of Walter Hume's invention is still a significant part of our business, Humes has continuously responded to changing market needs by improving our manufacturing methods and evolving our product range with new mixes, linings, reinforcements and joints. With ongoing research and development, and by bringing together the best technologies and products from around the world, we have maintained our market leadership through the decades.



Humes is immensely proud of our heritage and achievements as a company over the last century, with innovation and passion for what we do at the very core of our business. In Humes, our customers have a reliable, trusted and long-standing industry partner that is focused on delivering a quality solution to meet their needs.







## Our capabilities

Humes is well positioned to help our clients achieve successful outcomes for their projects.

With 12 factories and sales offices, our national infrastructure enables local staff to respond efficiently and economically to our customers' needs.

We have over 100 years experience in precast manufacture and with over 40 engineers on staff, our business has the specialist skills to deliver smart product design, and efficient, reliable manufacturing. Our extensive experience gives us a greater ability to help our clients with unique and difficult design challenges.

Humes has its own national design services group based in Brisbane which allows us to work directly with our customers to design and manufacture products to meet their individual project needs.

### Our design capability

Our in-house design department works closely with our customers to ensure that any project design is maximised for performance, cost savings, and installation efficiencies. Using their in-depth knowledge of our product range ensures they can contribute immense value to a project design.

The design group includes professional civil and structural engineers and draftsmen, with links to external engineering consultancies and various university engineering and geotechnical groups. The group has extensive experience in the design of rail infrastructure projects.

The Technical Services Group holds a certificate of registration with SAI Global for compliance with AS/NZS ISO 9001:2008.

# Our commitment to our people and the environment

Humes is committed to eliminating occupational injuries and illnesses, reducing our environmental impact, and being sensitive to the communities in which we operate.

The Humes Safety, Health and Environmental (SHE) standards set auditable criteria to continually ensure alignment with the SHE management system. They are designed to ensure the company's commitment to manage safety, health and environment and are to be understood and observed by all Humes' personnel.

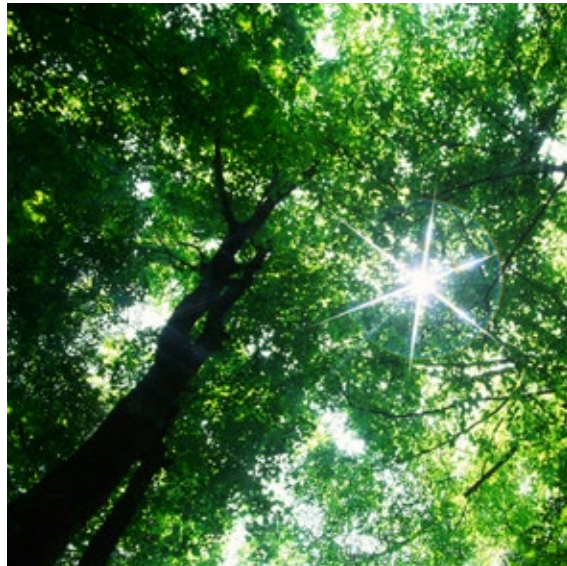
Key components of our program include:

- our policy on safety, health and environmental issues
- our commitment to meet legislative obligations, identify safety, health and environmental risks, set targets with measurable outcomes, and consult and report on performance
- our standard which specifies the requirements our sites must follow in the identification, assessment, and control of safety, health and environmental risks
- business unit plans which detail initiatives, goals and measurable targets for improvements in safety, health and environmental performance
- internal and external audits to verify implementation of the SHE system
- internal and external performance reports
- a corporate safety, health and environment team and site leaders to oversee and assist with change within the business.

## Sustainable development

The LafargeHolcim Foundation for Sustainable Construction promotes sustainable responses to the technological, environmental, socioeconomic and cultural issues affecting building and construction at the national, regional and global levels.

To encourage innovative approaches to sustainable construction, the foundation conducts activities including: LafargeHolcim Awards competition, LafargeHolcim symposium, LafargeHolcim Grants seed funding for building initiatives and grants for research projects.



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