



QUATTRO  
PROJECT  
ENGINEERING

ENGINEERING PARTNERSHIPS





Engineering partnerships  
delivered with **efficiency,**  
**innovation** and **energy**





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Quattro Project Engineering Pty Ltd are a Consulting Engineering, Management and Contracting Company servicing the resources industry.

Headquartered in Perth, Western Australia, QPE has completed project work in various capacities for a diverse range of Clients including Top Tier, Mid Tier and Junior Mining Houses that encapsulate all phases of the Project lifecycle.

By applying the disciplined principles of Engineering through all phases of the project lifecycle, QPE offer reliable, predictable project outcomes.

With **innovation embedded in our culture**, QPE are constantly on the search for safer, more efficient and cost effective ways to do things. From product development, to bespoke contracting, QPE bring this way of thinking to every challenge we encounter.

## Mission

QPE aim to be a safe, sustainably profitable Company with a culture developed around human resource and innovation. We strive to be a world leader in the delivery of projects and the institution of change through innovative thinking.

## Points of Difference

### innovation

QPE personnel are encouraged to think critically and question convention. Our culture is one that backs our people and their ideas as a fundamental component of our business strategy.

### energy

Projects are only as successful as the people managing them. It takes energy to create successful project outcomes and QPE's people have the drive to make it happen.

### efficiency

Engineering by definition must be efficient. QPE apply this principal through all phases of a project lifecycle to ensure positive project outcomes.

## Consulting

At Quattro we offer a wide range of Consulting, Design and Advisory services for various sectors and industries within Australia and overseas. Our in house technical capabilities include Civil, Structural and Mechanical with Electrical and Control services provided via established associated consultants and group companies.

Our experience and understanding of industry specific requirements allow us to develop holistic, robust and reliable solutions to meet our client's needs from conceptual stage through to project delivery. In addition we have extended our capability into Mine Backfill Design and Rheology technical services through the establishment of our own laboratory to conduct critical testwork.

Within the resources sector QPE have steadily grown its capability to provide the following technical and consulting services:

- Process and Plant Design
- Material Handling Systems Design and Evaluations
- Engineering design and Management
- Pre-feasibility, Feasibility studies and cost studies
- Due diligence inspections
- Technical reporting
- Specific equipment and Prototype testing and design registration
- Commissioning
- Certifications
- Technical Engineering Secondments and Training
- Backfill testwork





## Classified Plant Inspections and Design Registrations

Many of QPE's Engineering personnel are vastly experienced in the inspection and certification of classified plant in accordance with statutory and non-statutory requirements across Australia and overseas.

Our services include full management of and audits of all equipment and plant on site. We offer detailed reporting and digital file management for each site.

Services Include:

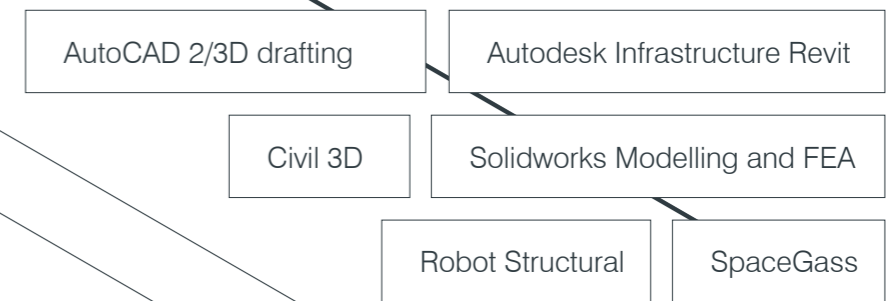
- Plant Inspections and Audits
- Audit of Site Documentation and Systems
- Design Registrations
- Pressure Vessel Testing
- Systems Set-up and Management

## Design & Drafting

QPE have an extensive suite of 2D and 3D software capabilities to provide a large range of design and drafting services to complement our engineering and consulting services.

From large scale civil infrastructure developments to single component 3D modelling and 3D printing Quattro have experienced staff to provide detailed solutions and designs to meet the needs of our clients.

In addition, utilising similar software across our group companies allows for seamless and integrated solutions to be developed at an early stage to identify key features and design requirements. As a multi discipline consultancy this provides an important tool for collaboration through the design process into detailed design development.





## Study Work

QPE have an extensive design catalogue, construction history and operational expertise from which to draw robust information to aid in the evaluation of mine infrastructure projects.

Whilst the focus of our clients is and should be the mining operation, QPE ensure that practical, serviceable and fit for purpose solutions are developed for mine infrastructure. Once specified, our extensive list of turnkey delivered projects ensures that our Capex and Opex estimates are robust and defensible ensuring that these non-revenue earning expenditures don't create any unwanted surprises during project development.

QPE own and operate a dedicated Paste Backfill laboratory in Kalgoorlie, Western Australia. This laboratory allows our Engineers and Technicians to develop mix designs based on empirical data – a key to the development of any successful and reliable paste backfill system.

## Certification

QPE provide a range of certifications to suit both our client's needs and our range of in-house designed products. This varies from design certifications to inspections and certifications of manufactured equipment and plant.

All certifications by our staff are carried out by chartered engineers who are registered to Engineers Australia NPER or RPEQ.

For our products these have been tested to meet both industry and statutory standards and our certification process is the final piece of our QA/QC system. This may be only one element of a process however this is a key component and is constantly being reviewed to ensure we are up to date with current regulations.

- Structural Certification
- Structural Steel
- Fabricated Components and Surface Treatments
- In-situ concrete and Pre Pour Reinforcement Inspections
- Structural Testing
- Design Registrations
- Design and Construction Compliance





## Campaign Installation

Underground mining is driven by production. As such, infrastructure requirements to support production often take a back seat.

QPE have developed standardised designs for many key pieces of underground mine infrastructure which enable us to offer turnkey supply and install solutions enabling mine personnel to remain focused on production.

Our designs have been shaped by input from operational personnel with many years of experience, while our installation crews come with extensive underground experience, the works will be executed in accordance with our groups stringent safety policies.

## QPE add value by;

Highly practical, reliable and standardised designs for typical mine infrastructure



Experienced underground trades personnel



UG ready plant, equipment and tooling

## Turnkey

QPE are adept at the turn key delivery of mine infrastructure. We understand the operating environment of mine sites and our delivery methodologies and programmes make provision for site requirements.

Our Engineering team develop buildable, practical designs while our procurement systems and established supply chain allow for the seamless translation of design documentation into material at site. Our personnel have all been trained and ticketed in accordance with recognised training institutions and are managed by our Project Engineering team who are typically Engineering qualified, though adept at project control and management.

Our goal is to take the stress and worry out of project delivery from concept design through to commissioning. QPE's preference is to deliver our proven designs safely, efficiently and reliably all in accordance with our certified systems and methodologies.

In house Engineering and Drafting capability with extensive mining experience

Input from our parent company and their 30 years of experience

Certified systems

Proven supply chain

Experienced personnel





## BOOT

As an extension to our Paste Backfill capability in engineering and construction, QPE have several contracting options relating to the ongoing provision of paste operational support.

From fully financed modular plant Build, Own and Operate (BOO) or mobile plant for campaign fill regimes through to supplementary personnel to cover annual leave or an operational shortcoming, QPE can assist.

Our BOO(T) offering significantly reduces the requirement for Capital monies and allows our clients to yield the benefits of paste fill and only pay for it when ore is being removed. QPE employ experienced Paste Engineers, Plant Operators and Paste Crew and own the mobile plant and equipment typically utilised as part of any paste operation.

- Modular plant design allows finance options
- Experienced and qualified staff and operational personnel
- Mobile plant and equipment
- Extensive history in fill operations

## Operations

QPE have a unique contract offering for the provision of a paste fill plant and the associated operational requirements of personnel, plant and equipment to take on the responsibility for a paste fill operation.

Further, QPE can also take on the operation of existing paste plants and have been proven to realise increased efficiency from such arrangements. In addition to the above, QPE can also supplement any ongoing paste operation through campaign reticulation installation, plant operators, paste engineers and coordinators on secondment.

There are a multitude of ways that QPE can complement an existing operation.





## Introduction to Holistic System Design

Gravity fed fill delivery systems are limited in the available driving head to ensure the system flows. As such, the further the reticulation system extends from the paste plant, the greater the system friction to overcome.

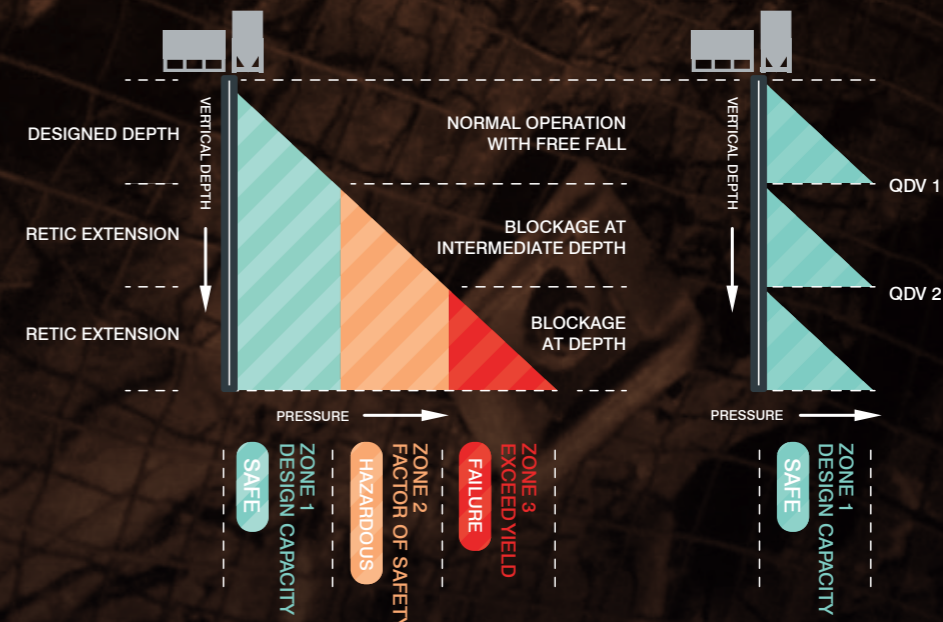
Typical paste systems are subject to conflicting drivers; Firstly, to reduce the amount of binder required to achieve strength which is countered by the requirement to achieve flow from surface to stope. In refining the mix to minimise binder, the solids content is increased to the point where the total system friction head approaches the system gravity head.

To allow operators to encroach ever closer to this point, QPE developed a series of proprietary diverters that maintain the full line condition with automated electric over hydraulic or pneumatic actuation.

QPE's Engineers develop system flow modelling which predicts the change in pressure across a given segment of reticulation. QPE's pressure sensing spools, strategically incorporated into the reticulation, can then provide feedback to the plant operator of the actual line pressures and when the pressure drop is approaching a predefined limit. Once the limit is reached, the operator can actuate the diverters to a dump position and run a flush sequence.

This sequence effectively divides the systems friction head into segments, whilst maintaining the available gravity head for system flush which ensures key infrastructure of boreholes and reticulation pipework can be cleared quickly and effectively to allow operators to minimise binder without jeopardising the fill operation.

- Modular plant design allows finance options
- Experienced and qualified staff and operational personnel
- Mobile plant and equipment
- Extensive history in fill operations







The Quattro QD4 four position diverter in operation at an underground mine in Western Australia

## Testwork & Mix Design

QPE have invested heavily in our paste capability. Our Kalgoorlie Laboratory, allows us to undertake UCS, Slump and viscosity testing of samples to generate robust data for decision making and system design.

We have developed a structured testwork methodology which can be tailored to any budget and generates data to enable evaluation of the preferred mix and the associated fill performance.

In addition, key elements of data are utilised by our Mechanical Engineering team to develop flow models of reticulation systems and evaluate the estimated operating parameters. These models form the basis of system control and can be calibrated through the use of a control loop in the reticulation during operation.

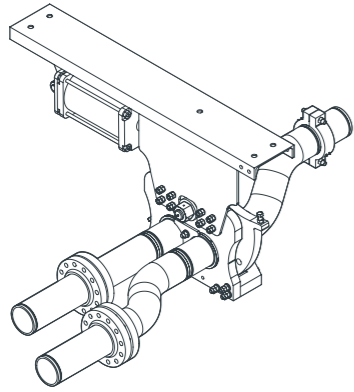
Based on the above, QPE develop reliable paste solutions and provide key data to enable plant and system PLC's to have a degree of automation over the systems standard operating procedures (SOP).

Own and maintain a testwork laboratory

Mix Design

Flow Modelling





## Innovation & Solutions

The mining industry is perpetually driven by the requirement for increased efficiency and safety. To that end, QPE have worked hard to develop a culture where our people are encouraged to look at existing processes with a view to developing better ways to do things. This attitude has seen the development and launch of a multitude of in house products that have contributed extensively to the progression of the industry.

QPE own and operate two (2) state of the art 3D printers which enable us to translate our ideas into digital models before turning it into a physical object for prototyping and product development. Adoption of such technologies is testament to our commitment to innovative thinking.

Our range of Q Products have been developed from the pursuit of improved safety and efficiency from our own contracting operations, a changing legislative environment, or the critique of conventional methodologies. Each has been proven to achieve its goal of contributing to the continual improvement of the industries we service.

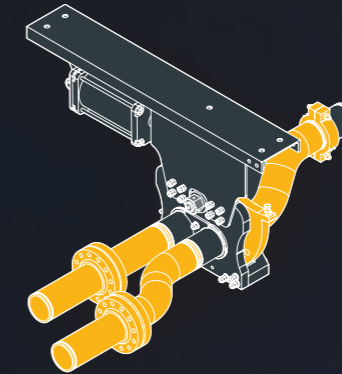


Download full product brochures at [quattrope.com](http://quattrope.com)



### 2 POSITION DIVERTER

A backs mounted, two position backfill diverter offering full flow diversion with either manual or automated actuation complete with an extensive range of accessories.



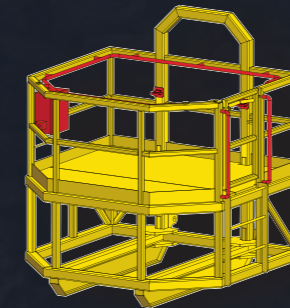
### 4 POSITION DIVERTER

A ground or backs mounted, four position backfill diverter offering full flow diversion with automated actuation.



### MOBILE ELEVATED WORK PLATFORM

The industry's first certified range of AS1418.10 compliant work baskets to be coupled with standard Tool Carriers for underground use.



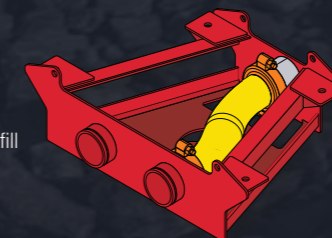
### FAN HANGING SYSTEM

A proprietary system developed to increase the safety and installation efficiency associated with hanging in line, secondary fans.



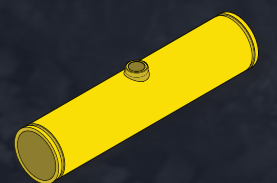
### CHANGEOVER SPOOL

A manual, two position backfill changeover spool to greatly reduce line change out time.



### PRESSURE SENSOR SPOOL

A standardised spool to enable inline pressure sensing to allow system control.







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