Corporate Profile

FRASER OSBORN

CONSULTING
ENGINEERS

ABN 55 010 616 207

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Company Details

Fraser Osborn (Qld) Pty Ltd

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General Information

Quality Assurance System

Fraser Osborn has third party accreditation to AS/NZS ISO 9001:2008.

Description of Activities

Fraser Osborn is a multidiscipline engineering company working primarily in the resources sector.
The extent of services provided depends on Client requirements and can include: design and specification only; design, specification and supervision; through to full Engineering Procurement and Construction Management (EPCM). Projects include: scoping studies, pre-feasibility studies, feasibility studies, new projects, plant modifications and upgrades and plant relocation, special purpose machinery design, infrastructure and environmental designs.

Overview of Senior Personnel

Mechanical:

Frank Osborn - A Senior Mechanical Consultant with over 35 years of diverse materials handling experience. Projects include: scoping, feasibility studies, design specification and supervision, and EPCM projects for steam and diesel power station supporting services, pressure pipelines and pumping for petroleum products, water and process liquors, plant modifications and upgrades,

Russell Clark - A Senior Mechanical Engineer with 30 years experience in design, project planning, construction and maintenance of processing plants including 13 years undertaking all aspects of mechanical maintenance of a power station (coal fired, 37.5 MW).

Michael Evans - A Mechanical Engineer experienced in design, procurement and supervision of construction of processing plants.

Civil / Structural:

Cliff Fraser – A Senior Civil and Structural Engineer with 30 years experience in foundations and structures for heavy industrial, vibrating, and processing plants as well as supporting infrastructure from feasibility studies through to plant design and construction. Experience includes piled foundations, mass concrete footings, lined containment structures, pumping and reticulation of water, process liquors and reagents.

Ian Menzies – A Senior Structural and Civil Engineer with experience in structural and civil design, review and refurbishment of heavy structures and pavements extending back to 1966. Experience includes processing plants, infrastructure, pipe racks and pipe bridges.

Matthew Boschen - A Senior Civil Engineer with a background in Project Management and civil design including wastewater treatment and water supply systems.

Electrical:

Iain Morrison - A Senior Electrical / Electronics Engineer who has had extensive experience in all aspects of control systems and power supply including upgrades and maintenance of major processing plants.

Brad Ralph - A Senior Electrical Engineer with experience in Distributed Control Systems (DCS), instrumentation, plant automation (PLC), commissioning and HV reticulation, provision of technical expertise for the day to day running of the State control rooms located in Townsville and Rockhampton, negotiation and co-ordination of protection settings with high voltage customers and provision of technical input to projects.

Other Senior Personnel

John Brewer:	Senior Mechanical / Piping Drafter. He has worked with Fraser Osborn for over 20 years on materials handling and processing projects from design through to construction supervision and commissioning.
Michael Soper:	Mechanical/Structural Drafter experienced in design, and supervision of construction of processing plants
Brian Grant:	Senior Mechanical/ Structural Drafter has worked with Fraser Osborn on pumping, piping, processing and materials handling projects for 20 years
Udo Magdowski:	Senior Mechanical Designer with background industrial materials handling equipment design.

Support Personnel

Support personnel include:

- Engineers
- Drafters (from Cadets through to Designers with in excess of 30 years experience)
- Planners
- Site Personnel
- Secretarial + Administrative Personnel

Process Plants - General

Lihir Gold Mine

The Company undertook the EPCM design and construction of a gravity concentration and high intensity cyanidation circuit.

Value US$21 Million.

Engineering, Procurement and Construction Management for the installation of an additional 38 metre high compression thickener to increase density of autoclave feed.

Osborne Mine

Scoping study and capital cost estimate for Site storage building and rail loading facility plus train unloading and conveying, storage and reclamation system for 1 Mtpa magnetite project.

BHP Yabulu Refinery Nickel Cobalt Oxy Hydroxide Plant

Fraser Osborn, in association with Kvaerner Metals, undertook the feasibility study based on Nickel Refinery's process research for a Cobalt Oxy Hydroxide Plant. The plant involved leaching, solvent extraction and concentrate filtering stages to produce required products. Variations to products could be obtained by modifications to the process to suit particular client requirements.

The$32 Million plant was subsequently constructed and has since then has been expanded by refinery personnel.

Xstrata Coal Prep Plant Upgrade

This was completed in two stages to increase throughput from 650 tph to 1,350 tph and included the installation of 2 off 110 square metre belt filters.

Project Capital cost was $18M with design throughput achieved within 24 hours of commencement of commissioning of third module.

110 square belt filter bed during construction.

BHP Billiton Cannington

Fines "Split Flotation" Plant

The project separated the minus 5 micron material from the 300 tph process stream and separately treated the material before blending the resulting concentrates back with the main process stream. The detailed design and construction was undertaken immediately after the feasibility study and the plant was commissioned on time and below budget. Capital value $10 Million. The plant increased recovery by around 3%.

Fraser Osborn undertook the capital cost estimate and detail design of$32 Million surface works component of the $130 Million Northern Ore Body Expansion including the minerals processing component of the expansion project.

The construction was scheduled so that tie-ins to the existing plant would occur during scheduled shut downs of the operating plant.

Equipment installed included:

- 200 tph scats crushing facility
- 2 x Vertimills *(including a 1500 kW version – the largest built to date)*
- Cyclones
- Additional flotation capacity
- Paste fill conveyor control systems
- Reagent and acid storage tanks
- Pumps
- Piping
- Foundations
- Concrete and structures.

Ok Tedi Copper Mine

Engineering, Procurement + Construction Management for the installation of 2 off Metso VPA vertical plate pressure filters for dewatering of around 750,000 tonnes of copper concentrate per year. Value US$12 Million

Ok Tedi Mining - Kiunga
Concentrate Dewatering Filters

Conversion of two off 50 metre diameter Dorr Oliver (GL&V) thickeners on the right side and the left side of the photo to "high–rate" thickeners with Outukumpu high torque mechanisms as part of the $US130 M tailings flotation project

Additional works include redesign of the reagent storage and dosing facility and the conversion of CIL tanks to agitated storage tanks for pyrite tailings and works associated with 130 km tailings pipeline. $US10M

BHP Billiton GEMCO

Projects undertaken since 1986 include:

Structural designs, fuel farm upgrade, quarry dewatering, tails dam and decant tower design, dump station upgrades, design of mobile reclaim hopper car, concentrator modifications, conveyor designs and modifications, sand tails disposal procedure, water reclamation from tailings dams, provision of on site engineer, studies for increased capacity of crusher station.

Mobile reclaim hopper car at commissioning.

Process Plants - General

Cape Flattery (Silica)

2 Mtpa raw silica slurry transport pipeline and pumping system. Project including slurry mixing and storage primary and secondary slurry pumping stations and 6 kilometre slurry as well as return water pipeline and pumping system.

Xstrata Black Star

This conveyor is around 600 metres long with a vertical lift of around 70 metres and transfers 1.5 Mtpa of crushed ore from the Black Star pit to the existing conveyor system at Mt Isa. The existing conveyor system is approximately 42 metres above ground level at the transfer location.

Xstrata Black Star Conveyor

BHP Cannington

Design of paste fill conveyor including belt rotation system. The conveyor is specifically designed to minimise segregation of the cement strengthened paste fill material. The structure is elevated above 1 in 100 year flood levels to meet environmental constraints.

BMA Coal

This project was a “brown fields” plant modification to enable the relocation existing longwall mining plant from Crinum underground mine to Crinum East “High Wall” mine. Fraser Osborn scope included: Design and specification of 4km by 4000 tonne per hour overland conveyor, design of foundations, transfer chutes and associated structures for relocation of 30 metre high stockpiling conveyor, design of extension of reclaim tunnel, design of breaker station and rejects system. Project Value $A33M.

4000 tonnes per hour stockpile conveyor and stockpile reclaim conveyor.

Ok Tedi Copper + Gold Mine

Ok Tedi process 27 Million tonnes of ore per annum to produce over 200,000 tonnes of contained copper and over 17 tonnes of contained gold in concentrates per year.

Review of the capacity of the in- pit crusher conveyor system to raise it to 7100tph (actual) from 5300 tonnes per hour (actual) The installed power required for the main conveyor would have increased from 2700kWatts to 3600kWatts.

Xstrata Newlands Coal Mine

Redesign of train load out conveyor system from 3,300tph to over 4,100 tph to minimise train-loading times. Project increased effective train loading rate to 4,750tph at minimum cost

Water Supplies, Storage Dams + Dewatering

Ok Tedi Pit Dewatering Study

Feasibility study, costing and risk analysis for pumped dewatering of the Ok Tedi mine to a depth of 200 metres below the free draining level. Design was based on 8,800 mm rainfall plus groundwater with design capacity of up to 1600 litres per second.

Callide B + C Power Stations

Design and construct 1200l/sec cooling water supply system comprising 2.1 kilometres of DICL pipe and 4off pumps and associated electrics and controls.

Ivanhoe Cloncurry Project

Scoping study for reinstatement of water supply from Burke River, Mt Dore dewatering, water storage dams, site access road, camp refurbishment and new camp design, airport relocation.

Cascading lined storage dams

Pajingo Gold Project

Design specification and construction supervision of 36kilometrespipeline pumping system and dam including Native Title negotiations Cultural Heritage survey and liaison with Landowners, Native Title Owners, Mining Companies, Department of Environment and Pastoralists.

Anglo Coal Moranbah North Coal Mine

Fraser Osborn has developed a flanged dewatering pipe which maximises water flow within a given bore casing diameter while providing protection to power and control cables. It enables rapid pump installation and removal with a standard crane and workshop tools thereby reducing installation and removal costs. The pipe shown was designed for 200 litres/second against 400 metre head. Acceptance test was to hold 5.2Mpa for 1 hour with a 17 tonne static load on the rising pipe.

Ross Mining NL – Yandan Gold Mine

Design of the floodwater “harvesting” pumping arrangement, channel and associated storage dams for the raw water supply for the project.

MIM Nolan's Gold Process Plant (2MTPA)

The Company also designed the water intake and "harvesting" structure in the Burdekin River and a 22 km. pipeline to Ravenswood. Storage for raw water was in existing pits and submersible pumps for a reticulation system were installed from these pits to the existing plant, a distance of some 2 kilometres away

Minerals Processing Plant Structures + Storage Sheds

BHP Billiton Yabulu Nickel Refinery

Design of around 420 multi level pipe racks to carry the process liquors and power and control cables for the $600 M expansion program for the processing of Ravensthorpe nickel concentrates as well as the existing process pipes and power and control cables.

Structural audit of the nickel refinery and recommendations including multi-year program for remediation and maintenance or demolition.

Structural audit to determine remaining life of structures for buildings, material handling equipment structures and major storage vessels, silos and tanks.

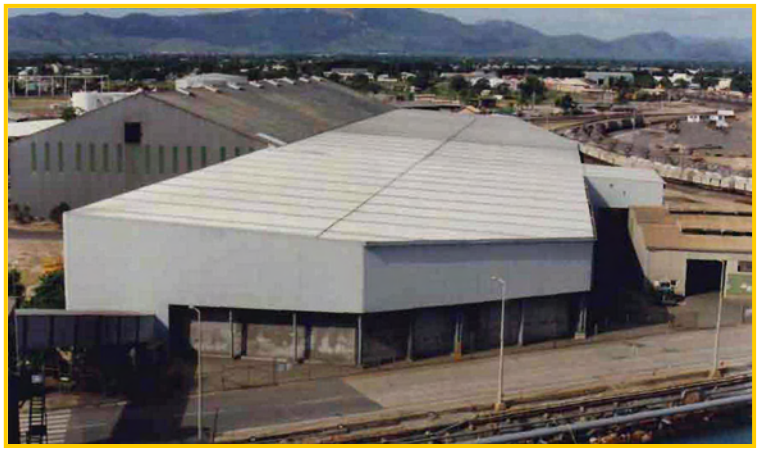
Legend International Holdings

The Client proposes to export phosphate rock for fertiliser manufacture. Fraser Osborn is currently undertaking the feasibility study for the design of rail unloading, storage shed, reclaim and export facility with the capacity to be expanded to 5 Million tonnes per year. The storage shed is approximately 200 metres long and 70 metres wide and will be fitted with a rail mounted portal frame reclaimer.

The site is upwind from a residential area, on reclaimed land in a cyclone area.

Xstrata Concentrate Storage Facility – Townsville Port

Fraser Osborn undertook design development, preparation of estimate and supervision of construction for concentrate storage shed shown below. It was 200 metres long with a maximum width of 55metres constructed with 9000 square metre roof. The roof supporting columns were piled, with the 6 metre high concentrate retaining walls on a mass foundation.



Facility included unloading of rail wagons, stockpiling and reclaim to ship loading conveyor system.

Metallica Minerals

The Client proposes to construct a lateritic nickel pressure leach project using sulphuric acid. Fraser Osborn has undertaken preliminary design and capital cost estimation for the construction of ship unloading, sulphur storage shed and sulphur reclaim to road transport.

The proposed site is at a port in North Queensland and is in a cyclonic area.

Reagents + Acids

BHP Cannington
Design and supervision of construction of sulphuric acid storage facilities as part of $32M “Growth” project

Oaky Creek Coal Preparation Plant

Design of reagent storage and pumping was an integral part of the expansion of the plant from 650 tph to 1350 tph

Townsville City Water Supply

The company undertook design, construction and operation of a reagent storage and dosing facility as part of an 8 year contract to ***Build, Operate, Supply and Maintain*** contract for supply of alum for water treatment

Alum Manufacturing Plant
A plant for the manufacture of liquid alum from sulphuric acid and aluminium tryhydrate has been constructed to supply alum to the above and other contracts.
The plant includes weighbridge, storage building, mixing vessel, reaction vessel, sulphuric acid and alum storage tanks and associated pumping and process control systems.

Ok Tedi Reagent System

Ok Tedi processes around 27 million tones of copper ore per annum in Papua New Guinea.
Fraser Osborn recently undertook the redesign of the reagent delivery system to the 3000 tph Ok Tedi copper processing plant.

Xstrata Mt Isa

Upgrade of reagent mixing, storage and dispensing facilities for lead/zinc stream at Mt Isa.

Power Supply + Control Systems

General Experience:

Fraser Osborn has undertaken the design of the HV and LV power distribution and process control systems within Client sites (for most of the projects shown) and worked in association with power supply authorities to deliver power to the site (including negotiations of supply or assistance with regional power authorities).

Specific projects:

Rio Tinto Kestrel Coal Mine Dewatering + Ventilation

Kestrel Mine Dewatering System to 300 metres with Scada (included Fraser Osborn designed flanged dewatering bore rising pipe)
Kestrel Ventilation Fan Upgrade Project (3 x 650kW fans incorporating VVVF drives).

Xstrata Oaky Creek Coal Preparation Plant Expansion to 1,350TPH

High and low voltage upgrade and extension to motor control centre and electrical distribution for Stage 1 and Stage 2 Upgrade of Oaky Creek Coal Preparation Plant from 650tph to 1350 tph. All major equipment in the Preparation Plant was replaced and a new control system installed.

BHP Billiton Cannington Growth Project

Cannington is one of the largest silver mines in the world and also produces lead and zinc concentrates. Fraser Osborn staff undertook the detailed electrical and instrumentation engineering design to expand the plant nameplate capacity from 1.8 Mtpa to 2.7Mtpa. Tie-ins to the existing plant were undertaken during scheduled plant shutdowns to minimise disruption to production.

BHP Billiton Yabulu Nickel Refinery Cobalt Oxy Hydroxide Plant

Design of electrical requirements including MCC, reticulation, sub-boards for the $32 Million Cobalt Oxy-hydroxide plant at Queensland Nickel. Project ranged from high voltage installations, MCC, fire protection and electrical distribution and controls.

Crushing + Sizing Projects

Pac-Rim Crushing Contractors - Townsville

Detail design of relocatable crushing plant and screening modules as well as modifications to vendor equipment to improve availability and reduce maintenance. Equipment sizes range from 54 inch jaw crushers, 66 inch cone crushers, 6 metre x 2.4 metre screens to purpose designed feeders and slewing stackers. These plants can be assembled in a week and are capable of 3-4 Mtpa.

Ciment Cibenon – Djakarta, Indonesia

Upgrade and expansion of the existing crushing plant to 7Mtpa of product to produce a range of products from 300mm rock down to fine washed sands utilizing jaw and cone crushers, impactors, vibrating grizzlies, wet and dry screening, trommels and cyclones. The primary crusher was an 84 x 60 DTRB Jaw Crusher. The products were used for the manufacture of a variety of building materials.

Nolan's Gold Mine

Fraser Osborn was awarded a $24 Million lump sum turnkey project for the design and construction of the Nolans CIL Gold Processing Plant. The plant included primary and secondary crushing, sag mill, ball mill and scats crusher and was designed to treat 2Mtpa with layout to enable expansion.
The Client later installed additional equipment and the plant was expanded to 5Mtpa

Fuel Receival + Storage

The projects are a sample of fuel storage dispensing and receival facilities undertaken for fuel industry companies such as Shell Boral and BP over the last few years. In addition to the above the company personnel have also carried out HazOps for the oil industry on various installations prior to use of the facility.

- **BMA Saraji Coal Mine** – Design of fuel storage dispensing and receival facilities.
- **BMA Norwich Park Coal Mine** – Conversion of rail tanker to road tanker fuel receival and storage facilities.
- **BHP Billiton Groote Eylandt** - Design of mobile service and fuel vehicle for mining manganese mine.
- **BP -** Hot bitumen storage, heating, pumping and mixing including rail tanker unloading and road tanker filling.
- **BP Various Installations** – Fuel storage pumping, piping and associated electrics, control and environmental control measures.
- **Shell Terminal, Townsville** – Projects including heat balance, storage, piping and pollution control plus review and certification of pressure vessels at various sites

Environmental + Rehabilitation

BHP Coal - Saraji

Design of industrial area waste water and runoff containment and treatment for removal of contaminants including petrochemical products, silt and detergents. Area included light vehicle wash down, mines vehicle wash down, lubrication bays, mobile equipment maintenance workshop and fuel and oil storage compound.

Capricorn Coal Management Pty Ltd (German Creek Mine)

Rehabilitation of open cut waste dumps including:

- Re-alignment and rock lining of drainage channels in rehabilitation areas.
- Design of energy dissipation structures, silt fencing, geo-fabric protection, slope minimisation to reduce surface erosion, and maximise topsoil retention and grass and tree regrowth.

North Goonyella Coal Mine

Design of industrial area run off containment and treatment facility to separate uncontaminated flows and to remove sediment, rubbish and petroleum products from contaminated flows

Anglo Coal – Moranbah North

Design of tailings co-disposal system at Moranbah North**.**