

# The Burdekin River



**Ludwig  
Leichhardt**

In March 1846, the Burdekin River was named by German explorer and scientist, Ludwig Leichhardt after Mrs Thomas Burdekin, who assisted Mr Leichhardt during his expedition.

In 1859, George Dalrymple explored the area in search of good pastoral land. Two years later, in 1861, the land along the Burdekin River was being settled and cattle properties and agricultural farms were established.

The Burdekin River is 740km long and the centrepiece to an entire network of rivers.

Most of the water that flows through the Burdekin River starts its journey slowly flowing through creeks and tributaries picking up more volume as it heads towards the Pacific Ocean.

During the wet season there is no shortage of water or wildlife surrounding the Burdekin River. As the wet season progresses the native wildlife flourishes and the dry country comes alive with all types of flora and fauna.

One of the major river systems in Australia, the Burdekin has a total catchment area of 130,000 sq km, which is similar in size to England or Greece.



# Burdekin Falls Dam

The site chosen for the Dam was the Burdekin Falls, 159km from the mouth of the river. The Burdekin Dam required a huge volume of concrete; it took 630,000 cubic metres for construction, all of it prepared on site.

It was built with an associated ice plant to limit concrete temperatures in hot weather. The concrete was carried to the dam site by special 18-metre haulage trucks known as 'road tees'.

To protect the project from flooding during the construction phase, a diversion was provided in the form of a conduit outlet.

A major milestone in the construction of the long-awaited Burdekin Dam was reached in November 1986, when the conduit outlets were sealed. They would let the river water flow through the Burdekin Dam wall during construction. With the sealing of the conduit outlets, the Burdekin Dam began taking its first water.

Throughout the construction phase the weather had been very kind. There had not been a wet season in the 2 ½ years it had taken to construct the dam.

As the last concrete was being poured, there was a moderate flow in the Burdekin, which filled the dam to 1/3 capacity. This in itself was a dramatic demonstration of what this structure could do for the entire region in years to come.

For much of its life, this mighty river lies quiet and inactive, but with little warning it can explode into a fury, sending millions of litres of fresh water to the sea.

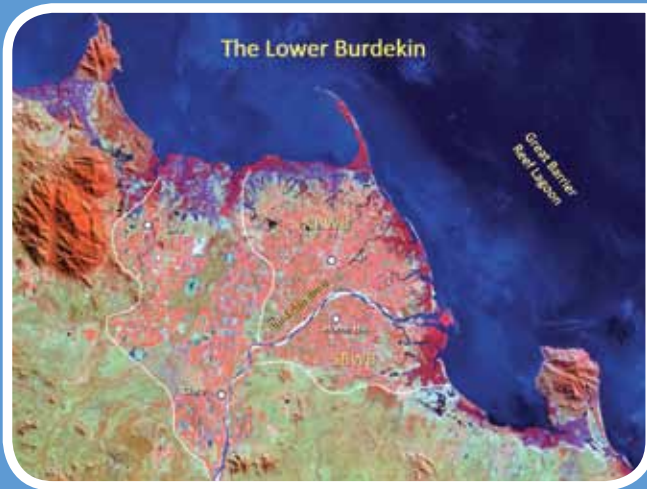
The body of water that builds up behind the Dam wall forms Lake Dalrymple and is the largest body of fresh water in Queensland. When full the dam holds 1,860,000 megalitres of water (or equivalent to four times the amount of water in Sydney Harbour).

As well as being a fantastic spot for camping, this lake is also popular for fishing with schools of grunter, sleepy cod, silver perch and black bream being native to the area and introduced species including red claw, yellow belly, golden perch and barramundi.

When water is released from the Burdekin Dam, it is held at the Clare Weir, which was upgraded for the task. The Clare Weir has a series of collapsible steel gates installed across its top and these can be individually or collectively raised or lowered to accommodate the different seasonal conditions and subsequent water demands of clients. When the gates are raised, the storage capacity of the weir is around 15,500 megalitres.



# Irrigation in the Burdekin



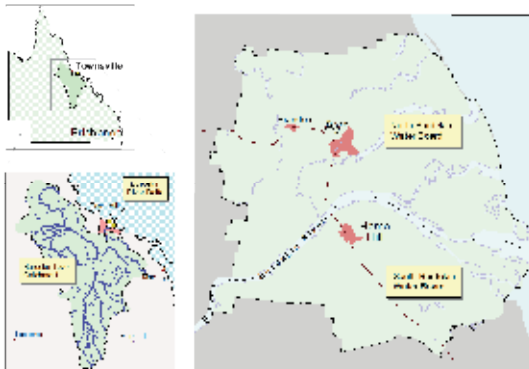
Water supply from the Burdekin Dam, Burdekin River and a massive underground aquifer are currently managed by two separate organisations - SunWater (a Government-owned corporation) and Lower Burdekin Water - (an unincorporated joint venture of the North and South Burdekin Water Boards which are autonomous bodies, independently funded by growers, millers and irrigators in the lower Delta). The North and South Burdekin Water Boards were formed in 1965 and 1966 respectively, following a series of very dry years and unprecedented pressures being placed on the Burdekin delta groundwater systems in North Queensland in the early 1960s.

The Burdekin Delta is a major irrigation area with approximately 38,000ha of irrigated sugar cane and other horticulture crops. This system is unique because it overlies major groundwater supplies, is close to environmentally sensitive wetlands, waterways, estuaries, and the Great Barrier Reef, and employs water management practices which have evolved over many decades in response to local needs.

Lower Burdekin Water manages part of the coastal plain known locally as the 'Burdekin River Delta', which is underlain by a multi-layered aquifer system.

The Water Boards have a charter that requires them to manage replenishment of groundwater contained in the aquifer, which is subject to a constant threat of seawater intrusion. The Water Boards currently use a number of strategies to manage groundwater replenishment, including the use of sand dams in the Burdekin River and a series of distribution channels and natural waterways together with large recharge pits to assist with artificial replenishment of the groundwater systems. The sand dams are constructed and maintained in the Burdekin River and are used to help maintain practical operating levels at river pump stations by containing releases from upstream storages.

## Burdekin Regional Map



The delta is the creation of the Burdekin River, evolving over thousands of years, a young and changing landscape in geological terms. The Burdekin drains seven per cent of Queensland and the immense power of the water tumbling down to the sea has carved many outlets and spread alluvial deposits over most of the Burdekin Shire, an area stretching from the Houghton River to Wangaratta Creek.

Source - Black Snow and Liquid Gold.

# Lower Burdekin Water

Lower Burdekin Water manages part of the coastal plain known as the Burdekin River Delta which contains a multi-layered aquifer system.

## Hydrology

The fresh groundwater hydrology of the area is complex and is dominated by the Burdekin River in its simplest form. The water beds within the area contain a dynamic groundwater aquifer to which water is added and lost. The Burdekin River water effectively replenishes the aquifer on both the north and south of the river.

Since the mid-1960s, water levels in the Burdekin Delta aquifer have been successfully managed by the North and South Burdekin Water Boards.

Gravity continually drains groundwater by an amount which is in direct proportion to the volume in storage above mean sea level. Recharge occurs both naturally and as a managed process. Natural recharge adds water via infiltration of rainwater and overbank floods and through water infiltrating through bed sands of the Burdekin River, creeks and lagoons found throughout the district. Managed recharge occurs through the pumping of water from the river through the Board's channels and manmade recharge pits.

## Artificial recharge

Managed aquifer recharge has been developed locally to ensure groundwater levels are maintained to minimise the threat of seawater intrusion along the coastal front while farmers access groundwater via bores for crop production. There are some 14km of pipelines, 305km of channels and approximately 40 operational recharge pits that are managed by Lower Burdekin Water.

Recharge pits are strategically located over underlying coarse sands and when clean water is diverted from the river to the recharge pits it naturally percolates into the aquifer. Some individual recharge pit areas when fully operational may recharge as much as 20 megalitres per day.

Besides the pits, other re-charge effort occurs through the beds and banks of natural watercourses that also form a large part of Lower Burdekin Waters' distribution systems. Lower Burdekin Water spends considerable sums of money maintaining and running the artificial recharge system.

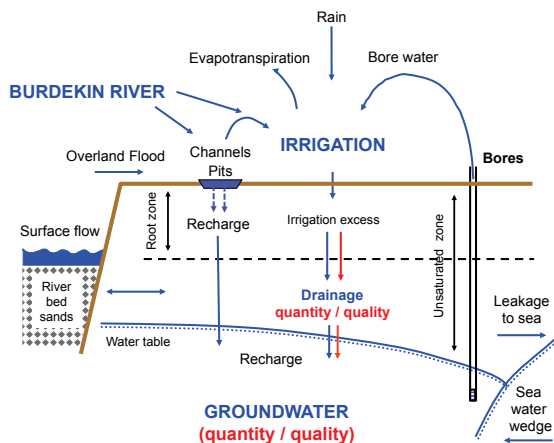
## Groundwater Quality

Measurements have shown that water quality has varied over the past 20 years. In some areas water quality has improved while in others it has deteriorated. In some areas, it has remained stable.

## Groundwater use

Most of the pumped groundwater is used for irrigation of sugar cane with minor amounts used for urban water supplies for Ayr, Brandon and Home Hill. Smaller amounts are used for small crops. Estimates range from 10 megalitres per hectare for a crop yield of 100 tonnes per hectare to 15 megalitres per hectare for a crop yield of 135 tonnes per hectare. However, 12 megalitres per hectare for 115 tonnes is common for the delta area.

## Conjunctive Use Making the System Work



● GEORGETOWN

### BURDEKIN RIVER

The Burdekin River Catchment is partially controlled by a number of dams and weirs with these storages providing water flows for irrigation, industrial, urban and stock use throughout the region.

### STATISTICS

River Length .....	740 km
Catchment Area .....	129,860 km <sup>2</sup> (7.5% Qld)
Maximum Flow 1958 Flood .....	35,300 m <sup>3</sup> /sec
Average Annual Flow .....	12.64 m Bruce Highway Bridge
	9,000,000 Megalitres



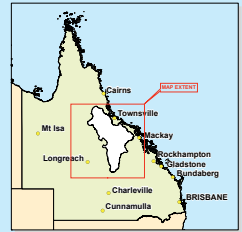
BURDEKIN FALLS DAM - Capacity 1,860,000 Megalitres



GORGE WEIR - Capacity 9,460 Megalitres



CLARE WEIR - Capacity 15,500 Megalitres

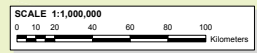


LOCALITY PLAN

**LEGEND**

- ▲ Dams
- ▲ Weirs
- ▲ Offstream Storages
- Towns
- Water Pipelines
- Arterial Roads
- Major Rivers
- Lakes
- Burdekin Falls Dam Catchment

# Burdekin River Catchment



### BURDEKIN FALLS DAM

#### Main Embankment

Type	Masse Concrete
Full Supply Level (FSL)	154.00 m AHD
Storage Capacity at FSL	1,860,000 ML
Storage Area at FSL	22,000 ha
Dead Storage	7,860 ML (at 124.00m AHD)
Dam Crest Level (DCL)	169.2 m AHD
Maximum Height Dam	57.0 m
Crest Length Along Axis (Main Embankment)	876.0 m
Crest Width	7.0 m
Total Quantities	650,000 m <sup>3</sup> Concrete

#### Spillway

Spillway Type	Central Ogee Crest ending at a flip bucket
Spillway Crest Level	154.00 m AHD
Crest Length	504 m
Spillway Design Capacity	64,600 m <sup>3</sup> /s
Spillway Capacity for DCF	69,800 m <sup>3</sup> /s

#### Outlet Works

Description	Three Outlet Chutes with radial gates
Radial Gate Dimensions	3.0 m x 2.0 m
Outlet Chute Design Velocity	30.0 m/s

#### SADDLE DAMS

##### Mt Graham North Saddle Dam

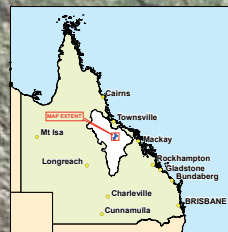
Type	Earth and rock fill with central clay core
Length	1,200 m
Maximum Height	11.0 m
Crest Width	10.0 m

##### Mt Graham South Saddle Dam

Type	Earth and rock fill with central clay core
Length	2,100 m
Maximum Height	11.0 m
Crest Width	10.0 m

##### Left Bank Saddle Dam

Type	Earth and rock fill with central clay core
Length	1,200 m
Maximum Height	36.0 m
Crest width	10.0 m (Typical)
	23.2 m at Headrace Channel



LOCALITY PLAN

MT GRAHAM NORTH  
SADDLE DAM

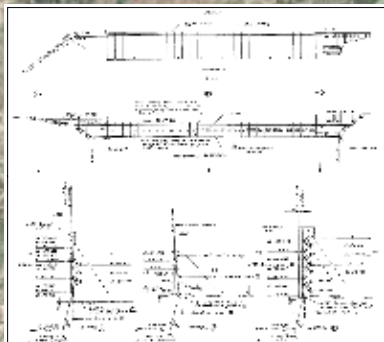
MT GRAHAM SOUTH  
SADDLE DAM

LEFT BANK  
SADDLE DAM

BURDEKIN  
FALLS DAM



BURDEKIN FALLS DAM (2000)



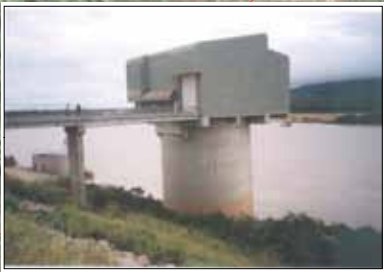
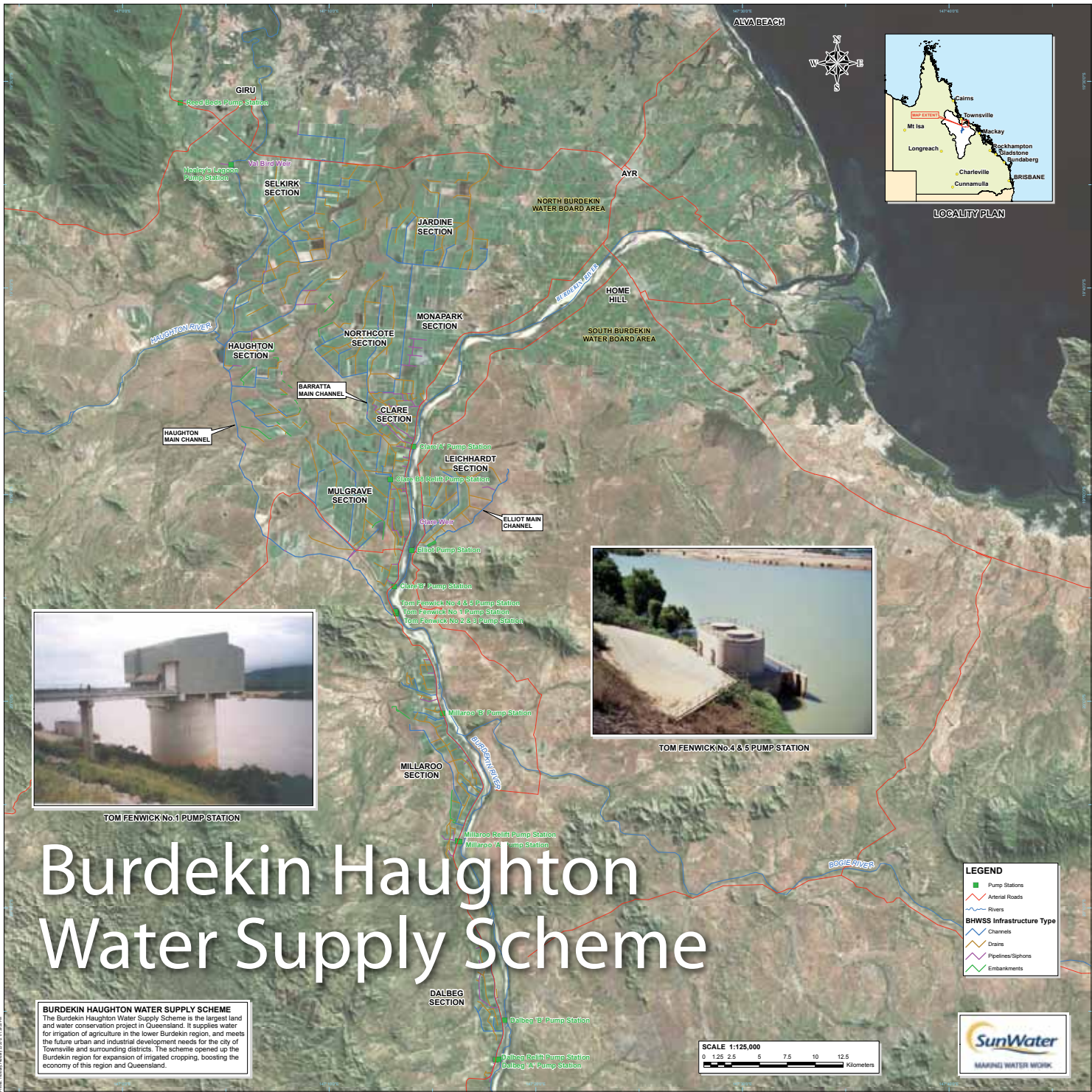
BURDEKIN FALLS DAM - Construction Details

# Burdekin Falls Dam

#### LEGEND

	Arterial Roads
	Rivers
	Burdekin Falls Dam Catchment





TOM FENWICK No.1 PUMP STATION



TOM FENWICK No.4 & 5 PUMP STATION

# Burdekin Haughton Water Supply Scheme

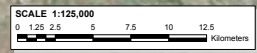
**BURDEKIN HAUGHTON WATER SUPPLY SCHEME**  
 The Burdekin Haughton Water Supply Scheme is the largest land and water conservation project in Queensland. It supplies water for irrigation of agriculture in the lower Burdekin region, and meets the future urban and industrial development needs for the city of Townsville and surrounding districts. The scheme opened up the Burdekin region for expansion of irrigated cropping, boosting the economy of this region and Queensland.

**LEGEND**

- Pump Stations
- Arterial Roads
- Rivers
- Channels
- Drains
- Pipelines/Siphons
- Embankments

**BHWSS Infrastructure Type**

- Channels
- Drains
- Pipelines/Siphons
- Embankments



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