

# 4. Impacts on Infrastructure

## **Burnett Catchment Water Infrastructure - Burnett River Dam**

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### **4.1 Introduction**

The purpose of this section is to ensure that all potential infrastructure impacts associated with the Burnett River Dam are identified. Specific environmental approval for the relocated infrastructure is not sought within this EIS. Rather, environmental approvals for the relocation of infrastructure will be the responsibility of the relevant authorities. It is envisaged that assessment of environmental impact of infrastructure relocation will take during the project implementation phase should the project be approved for construction. Only then will detailed design of the dam and associated infrastructure be finalised.

### **4.2 Existing Infrastructure**

#### **4.2.1 Roads and Bridges**

##### **4.2.1.1 State Controlled Roads**

The major state controlled roads to be used by the Project are:

- Bruce Highway, from Brisbane to Rockhampton, via Childers and Gin Gin. This highway crosses the Burnett River at Wallaville, downstream of the proposed dam, and will not be affected by inundation. Most construction materials (other than bulk earth and rock) for the project will be transported via the Bruce Highway, either northbound or southbound.
- Isis Highway from Bundaberg to Burnett Highway, via Childers and Biggenden. This highway does not cross the Burnett River, and is not affected by inundation. This road will form the main transport route from the Bruce Highway to the site via Dallarnil. It is a designated B-double route.
- Booyal – Dallarnil Rd, which may form part of the main transport route for materials from Gladstone.
- Burnett Highway from Nanango to Mt Morgan, which crosses the Burnett River at Gayndah and Eidsvold.
- Gayndah – Mt Perry Road, which has a bridge crossing of the Burnett River approximately 20 km upstream of the dam, known as Mingo Crossing. This crossing will be inundated at full supply level.
- The Mt Steadman Road which connects with the Gayndah – Mt Perry Road, just south of the bridge crossing, but outside of the inundation area.

##### **4.2.1.2 Other Roads**

There are a number of local roads and farm tracks near the river, and several causeway crossings of the Burnett River and its tributaries.

##### **4.2.1.3 Site Access Road**

The proposed access road for both construction and operation of the dam will be from the Isis Highway, 1km north of the village of Dallarnil, as shown on **Figure 4.1**. The access road will be constructed within an existing right of way/ road reservation, except for the first 1.5km where a new alignment is required to provide a safe, controlled intersection with the Isis Highway. The existing gravel roads within the road reserve (North Dallarnil Rd, River Rd and Campbells Rd) provide access to several properties adjacent to the riverbank near the dam site. The access road will be upgraded to a 2-lane rural road standard with a two coat bitumen seal. Gravel for the road base will be sourced from within the reservoir area adjacent to the dam site.

##### **4.2.1.4 Traffic Volumes**

The existing traffic flow along the major transport routes to the dam site are shown in **Table 4.1**.

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**Table 4.1: Traffic Volumes**

Traffic Route	Annual Average Daily Traffic (AADT)	Percentage of Commercial Vehicles (CV)
Isis Hwy, south of Dallarnil	870 - 1110	14 - 17%
Isis Hwy, north of Dallarnil	480 - 1100	6 - 10%
Booyal - Dallarnil Rd	330	22%
Site access road (North Dallarnil Rd, River Rd and Campbells Rd)	<50	< 5%

Source: DMR 22/8/01

### 4.2.2 Rail

There is an inland rail line, known as the Monto line, passing through Gayndah and Mt Lawless to Maryborough. There are several creek crossings in the catchment:

- Burnett River at Mt Lawless,
- Ideraway Creek at Ideraway (approx 4 km north of Gayndah)
- Steep Rocky Creek approximately 4 km north of Gayndah

### 4.2.3 Power and Telecommunications and Water

Electricity (Ergon Energy) and telecommunication (Telstra) access is supplied to most residences in the catchment. Some of these existing power and telephone lines will be affected by inundation from the dam, and will require replacement, or realignment. The extent of the affected works are shown on **Figure 4.1**.

### 4.2.4 Irrigation Distribution System

There is an existing irrigation distribution system within the Bundaberg Water Supply Scheme (BWSS). This system has unused capacity outside the current irrigation season. As the demand for additional water will most likely occur during this irrigation season, upgrade of the peak flow capacity of the distribution system will be required.

Many landholders have privately owned irrigation pumps adjacent to the river, some of which will need to be relocated.

### 4.2.5 Other Infrastructure

The Bicentennial National Trail traverses the area, crossing the Burnett River close to the proposed dam site (no bridge exists at this point however).

No other major infrastructure that might be impacted by the dam project, such as gas, reticulated water or sewerage, has been identified at this stage.

## 4.3 Infrastructure Required for Construction

### 4.3.1 Site Access Road

The existing access roads to the dam site will be upgraded and where necessary realigned, as discussed in **Section 4.2.1.3**.

Haul roads will also be required to transport rock and earth from quarries and borrow pits to the site. The location of quarries and borrow pits will be finalised during detailed design and haul road routes will also be identified at this time. It is likely that quarries and borrow pits will be located within the inundation area and haul roads may be constructed adjacent to the riverbed where feasible. These roads will require proper formation, controlled drainage and erosion control measures to minimise impacts on water quality in the Burnett River. Most haulage will take place during the first construction season.

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### **4.3.2 Other Infrastructure**

Operation of the pug mill, concrete batch plant and screening plant will require 415 Volt, 3-phase electricity supply. This can be supplied from the existing grid or from portable generator sets provided by the construction contractor. If external power is to be used a power line will be installed along the access road. An engineering and cost comparison will need to be carried out to determine the most appropriate option. In any case, a 240V power supply will be needed at the site for offices, amenities and safety lighting during operation and this power line will be installed along the access road from the Isis Highway.

Similarly, telecommunications may be provided by satellite phone or land lines along the access road, subject to a detailed analysis of both options. Supply of power and telecommunications will be confirmed and approved by relevant suppliers.

Water for concrete mixing and other construction processes will be drawn directly from the Burnett River. Water for offices and amenities will be collected from rooftop catchments and supplemented with water brought in by tanker as needed.

### **4.4 Impacts on Existing Infrastructure**

The following lists of impacted infrastructure are not necessarily exhaustive due to the limited information currently available. Further survey work will be undertaken as part of the detailed design phase, and any additional affected infrastructure identified.

#### **4.4.1 Site Access Road**

Connection of the site access road to the Isis Highway north of Dallarnil will require the establishment of a new road reservation, and property acquisition. This will affect the landholders, as discussed in **Section 17**.

#### **4.4.2 Traffic**

##### **4.4.2.1 Construction Traffic**

Construction traffic will include:

- Hauling of rockfill and concrete aggregate from the quarry site. As part of the appraisal study deposits of sand and gravel were located within the flood channel and inundation area, within easy haul distance of the dam. A quarry with a reserve of 1.5 million m<sup>3</sup> of basalt for coarse aggregate and rock fill was located within 1km of the dam site. This material would be transported along haul roads within the impoundment area.
- Transport of machinery, possibly from local areas such as Gayndah, via the Isis Highway south of Dallarnil, or regional centres such as Bundaberg or Gladstone, via the Bruce Highway, and/or Isis Highway north of Dallarnil. Equipment used in the construction process is expected to consist of:
  - 2 tower cranes
  - 3 mobile cranes
  - 6 scrapers
  - 3-4 bulldozers
  - 2-3 loaders
  - 2 drill rigs
  - 5 dump trucks-40tonne
  - 5 dump trucks-15tonne
  - 3 vibrating rollers
  - 1 rubber tyred roller
  - 2 water carts
  - waterpumps
  - 6 utilities

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- Transport of construction materials. It is expected that heavy vehicles bringing materials and equipment to site will travel along the Bruce Highway and then along either the Isis Highway or the Dallarnil – Booyong Rd to the site access road described in **Section 3.1.1**. Truck traffic on public roads will be heaviest in the second half of the construction program when large quantities (20,000m<sup>3</sup>) of cement, steel reinforcement (2000 tonnes) and dam appurtenances are transported to the site. The transport of materials will be consistent throughout the day, rather than concentrated in peak periods.
- Construction workers, commuting from local towns such as Gayndah, Biggenden or Childers. These movements will be concentrated in peak periods before and after shifts.

### **4.4.2.2 State Controlled Roads**

State controlled roads affected by construction traffic will be the Bruce Highway and Isis Highway. The Department of Main Roads (DMR) has produced *Guidelines for Assessment of Road Impacts of Developments Proposals*, which aids in the assessment of impact on state controlled roads (SCR). In general terms, (DMR) considers that an impact on a road is insignificant if there is a less than 5% increase in traffic, measured either as annual average daily traffic (AADT) or equivalent standard axles (ESAs).

It is estimated that at peak construction periods, there would be 80 workers, and therefore a maximum of 80 passenger vehicles (assuming no car pooling) to the site, i.e. 160 movements per day along the site access road, via the Isis Highway, either northbound or southbound. Heavy vehicle movements will be greater than 20 per day along the Isis Highway. Based on these estimates of traffic flow it is likely that the temporary flow increases associated with the construction phase would be:

- less than 1% change in ESA and AADT for the Bruce Highway.
- more than 5% measured as AADT and as ESA along the Isis Highway both northbound and southbound.

The impact on the Isis Highway is therefore considered significant. Although upgrade of the Isis Highway should not be required, as it is already a designated B-double route, a Pavement Impact Assessment (with terms of reference agreed by DMR) will be required to assess the impact on the road and to determine the appropriate developer contribution to road maintenance.

As part of the design of the access road to the Isis Highway, a Traffic Management Plan, (with terms of reference agreed by DMR) should be prepared to determine measures required to ensure safe traffic operation, e.g. turning lanes, signage, speed limits.

### **4.4.2.3 Operation Traffic**

As the completed dam will be unattended except for maintenance operations, traffic flow along the Isis Highway and dam access road will not be affected during the operation stage.

## **4.4.3 Road Infrastructure Affected by Impoundment**

**Figure 4.1** indicates the existing roads, bridges, power and telephone lines that have been identified to be at risk from inundation due to the dam.

Five roads (FC1, FC3, FC4, FC5, FC7) have been identified as being flooded at full supply level

### **4.4.3.1 State Controlled Roads**

The major road affected by inundation is the Gayndah – Mt Perry Road, as it crosses the Burnett River at Mingo Crossing (FC1) as well as at a creek crossing (FC7). As part of this project it is proposed to construct a new bridge over the Burnett River. This new bridge is likely to be adjacent to the existing bridge at Mingo Crossing, although other alignments may be considered, and will be subject to a feasibility and environmental assessment, and with agreement of DMR.

### **4.4.3.2 Local Roads**

The other road crossings are local roads, and inundation will affect landholders access to their properties. It will be necessary to either upgrade the existing crossing, or realign the road to ensure maintenance of property access at full supply level, and with community acceptable flood immunity.

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### 4.4.4 Railway

The Monto rail line, which crosses the Burnett River at Mt Lawless will not be affected by inundation, as Mt Lawless is above the full supply level (67.6 m AHD).

Hydraulic analysis of the dam affects was undertaken as part of the Initial Engineering Appraisal (DNR 1998). This study found that for a Q100 flood event, afflux at Mt Lawless will be 60 mm, which will not compromise the flood immunity of the rail line.

### 4.4.5 Irrigation Infrastructure

It is likely that a number of privately owned irrigation pumps would be submerged as a result of the dam impoundment. These pumps would need to be replaced and/or relocated to higher ground as part of the project. Survey work undertaken as part of the detail design stage will allow quantification of the number of affected pumps. For the purposes of costs estimation, 20 affected pumps have been assumed.

### 4.4.6 Power and Telecommunications

**Figure 4.1** identifies power and telecommunication cables that will be affected by inundation, and will need to be relocated. The cost of relocation of any power and telephone cables affected by the construction of the Burnett River dam and has been included in the project budget.

## 4.5 Environmental and Economic Impacts of Relocating and Upgrading Infrastructure

### 4.5.1 Cost Estimates

Proposed routes for the new roads, electricity and telephone lines were identified for costing purposes. The estimated cost of the required relocations is shown in **Table 4.2**. All these identified costs would be part of the project budget.

**Table 4.2: Estimated Cost of Infrastructure Impacts**

Infrastructure	Cost
Roads	\$572,000
Bridges	\$7,335,000
Electricity	\$549,000
Telephone	\$140,000
Irrigation Pumps (estimate)	\$800,000
<b>TOTAL</b>	<b>\$9,400,000</b>

Ref: DNR, 1999

### 4.5.2 Replacement of Gayndah – Mt Perry Rd Bridge

In order to assess the environmental effects of a replacement bridge for the Gayndah –Mt Perry Road crossing, the DMR procedure, as detailed in *Road Project Environmental Management Process Manual* (DMR, 1998) would be followed during the planning, design and construction stages. This procedure involves:

#### Concept

(Replacement of existing road, so not appropriate)

#### Planning Phase

- Identification of options for road alignment and bridge location
- Feasibility assessment of options
- Review of Environmental Factors (planning)
- Propose preferred option
- Determine whether Impact Assessment Study is required
- Prepare IAS (if necessary)
- Proposal accepted
- Prepare Environmental Management Plan (planning)

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### **Detailed Design Phase**

- Prepare Environmental Design Report
- Incorporate environmental issues in contract tender process

### **Construction Phase**

- Prepare Environmental management Plan (construction)
- Undertake environmental audits

### **Operational Phase**

- Prepare Environmental Management Plan (maintenance)

Environmental issues of particular concern to a proposed new bridge and potential road realignment are:

- Cultural heritage
- Native Title
- Vegetation
- Water quality
- Land tenure

### **4.5.3 Other Infrastructure**

For relocation of telecommunications cables, Telstra is required to organise the appropriate approval, in accordance with the *Telecommunications Act 1997*. Similarly, the *Electricity Act 1994* requires that Ergon Energy will gain the appropriate approvals for relocation of electricity infrastructure.

Consideration of environmental issues will be undertaken as part of the planning, design construction and maintenance phases of any infrastructure works, with the aim of minimising any environmental impacts. The environmental assessment procedure will be similar to that described above for state controlled roads.

## **4.6 Conclusion and Recommendations**

Replacement of the Mingo Crossing bridge on the Gayndah – Mt Perry Rd and upgrade or realignment of two shire roads will be required to maintain existing service after dam construction.

Environmental assessment and confirmation from DMR is required on the preferred route for the replacement of the bridge on Gayndah – Mt Perry Rd.

Recommended actions for the design phase of the project are to:

- Liaise with from Biggenden Shire and DMR regarding the proposed access road to the Isis Highway is required.
- Liaise with Kolan Shire Council prior to the construction of the proposed new local road sections.
- Liaise with Ergon Energy and Telstra is required prior to realignment of their lines.
- Undertake detailed survey work is required to identify irrigation pumps at risk from inundation, and negotiation with landholders regarding replacement or relocation.

The costs associated with all of the above works will be included in the project budget.