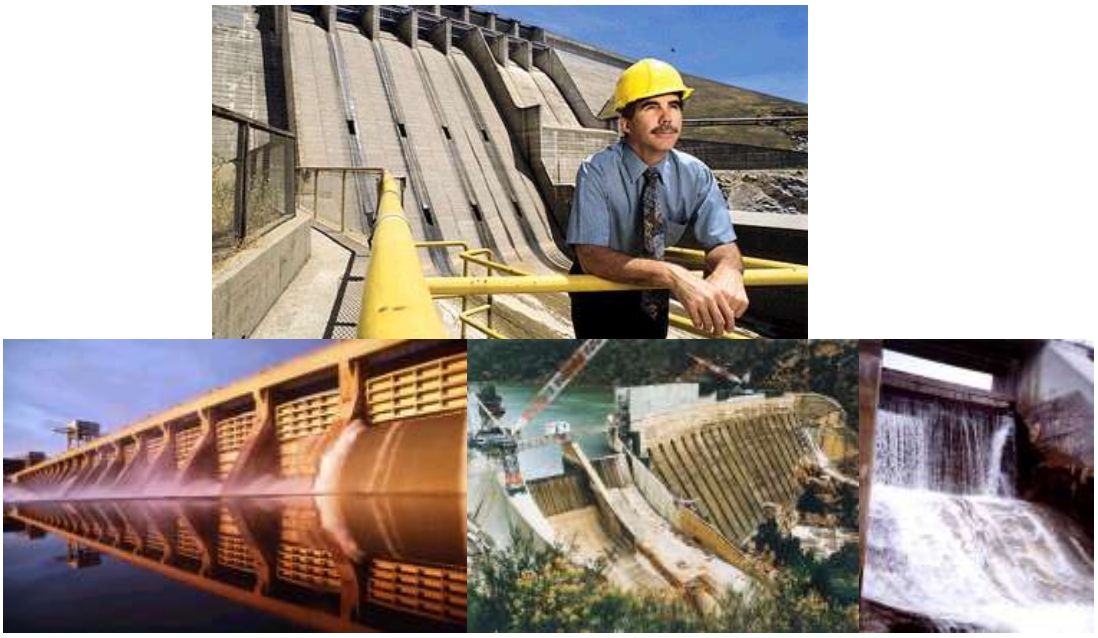
SMART WATER
FOR THE SMART STATE

URANNAH DAM

WATER FOR THE NEW MILLENIUM



BOWEN COLLINSVILLE ENTERPRISE

Urannah Dam – *Smart Water* for Queensland

OPPORTUNITY

The proposed Urannah Dam project offers Queensland the opportunity to showcase irrigation in the new millennium.

Old irrigation practices and technologies like flood irrigation, over application, mass vegetation clearing, rising water tables and salinity represent ***Dumb Water.***

These have been replaced by new ***Smart Water*** techniques like trickle & centre pivot irrigation, mulching, agro forestry and water table management.

The Urannah project can be a magnificent example of large scale sustainable irrigation – showcasing ***Smart Water*** …..efficient agricultural and irrigation practices for the new millennium.

WHAT MAKES URANNAH DAM UNIQUE ?

- **Low levels of water diversion in the catchment** – currently Urannah's catchment is only developed to 4% of available water flows – and after the construction of the dam this will rise to only 18%. Some areas of the Murray Darling Basin are trying to reduce allocation back to below 90% of available flows.
- **Green field development – but in close proximity to existing industries –** Urannah would be a Greenfield irrigation development, but is within 100km of the existing sugar industry in the Burdekin and Horticulture industry in Bowen – resulting in faster uptake of water by industry.
- **Easy Organic Conversion –** being a greenfield site used only for grazing purposes would enable land around Collinsville to be readily converted to certified organic status. ***Smart Water*** for Smart Farming.
- **Wet Tropics water catchment – Dry Tropics agricultural area** – the water that will be stored in Urannah comes from the wet tropics rain forest areas surrounding Eungella. The water will be used in the dry tropical areas surrounding Collinsville. The perfect horticultural and agricultural scenario.
- **Opportunities for the Indigenous Community –** the Urannah Dam site is owned by the Birri Gubba people who are committed to seeing the dam built to create meaningful opportunities for their people…..jobs for their kids.
- **Redundant Infrastructure In Collinsville** – the town of Collinsville once housed 5000 people – and has all the community infrastructure(housing, hospitals, schools etc) to cater for this population. Today there are 1800 people in Collinsville. Urannah Dam would bring the population back – without requiring the construction of a single new school or hospital bed.
- **Smart Water for many uses** – Urannah is ideally placed to supply water for many types of different activities including industrial as well as farming activities:
    - Smart Farming like organic horticulture and organic sugar production;
    - Coal mining in the Bowen Basin – future coal development in the Bowen Basin is constrained by lack of water supply;
    - Future Power Generation at Collinsville
- **The perfect Dam Site –** the Urannah Dam site is located in a deep valley which would produce a dam with almost the same capacity as Burdekin Falls Dam, but it will only flood 20% of the country that Burdekin Dam covers.

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PROJECT EXECUTIVE SUMMARY - CONSTRUCTION OF URANNAH DAM

INTRODUCTION

The proposed Urannah Dam site is located in the upper Broken River Valley South East of Collinsville. Urannah Dam would facilitate the development of a 20,000 ha irrigated agriculture zone (2/3 the size of the Emerald irrigation area) along the Bowen River near Collinsville.

Urannah dam site on the Broken River

With an estimated development cost of $150 million (dam construction), Urannah Dam would store 1.5 million ML of water. With a provisional Net Present Value of agricultural production alone of $564.8 million[1], Urannah Dam will also meet the future water needs of the Northern Bowen Basin Coal Industry and Collinsville Power Station (value of non-agricultural water use not included in NPV).

In 1998, the Mackay Regional Water Resources Strategy estimated the Net Present Value of the Urannah Dam (including non-agricultural water use) at $1056 million.

The land around Collinsville has been identified as suitable for sugar cane, cotton, citrus, grapes, peanuts, lucerne, and a variety of horticulture crops.

LIKELY DEVELOPMENT SCENARIO

A total of 41,000 hectares of suitable irrigable land was identified in the 1998 Collinsville Irrigation Soil Survey (Hyder Consulting). However, the actual usable land area is 28,600 ha (accounting for marginal land, riparian zones and infrastructure).

Of the gross area, 25,000 ha is suited to a wide range of crops, 7,900 ha is suited to cane only, and about 7,100 suited to cereals, tree crops and hay only.

Using the above parameters, the following potential development options in the Bowen Broken River sub-catchment have been proposed in the Scoping Study of Water Infrastructure Options in the Burdekin River Catchment (1999):

Crop	**Suitable Potential area**
Sugarcane 59 %	16,730 ha
Cotton 29 %	8,210 ha
Horticulture (various) 5 %	1,460 ha
Mixed broad acre (peanuts, leguminous pulses, maize) 6 %	1,600 ha

[1] Scoping Study of Water Infrastructure Development Options and Related Issues in the Burdekin River Catchment, Department of Natural Resources, Sept. 1999, Vol1: Main Report, p5-39

Lucerne hay 1 %	90 ha
Redclaw aquaculture 2 %	510 ha

The crop types and combinations have been selected in line with the findings of the Burdekin Agroeconomic Study (1999).

PROJECT DESCRIPTION

The format for Urannah Dam considered by the Burdekin Catchment Study is a two-stage construction:

Stage I of Urannah (storage capacity of 863,000 ML) would yield 146,000 ML/a (after environmental release) and service an estimated 13,300ha of irrigated land (or about 45 % of the irrigable land identified in the Bowen River area.

Stage II of Urannah (storage capacity of 1,500,000) would yield 176,900 ML/a (after environmental release) and would service 16,100 ha of irrigated land (or approximately 55 % of the irrigable land identified in the region).

However, the final yields and total amount of irrigable land that could be serviced by the Urannah Dam cannot be ultimately determined without additional hydrological modeling within the catchment (this modeling is being undertaken as part of the Burdekin Water Resource Plan process which commenced in Feb 2002). The final yields available for irrigation use are likely to exceed these initial stated yields following further detailed investigations within the sub-catchment, enabling larger areas of land to be developed. This work is ongoing.

The predicted cropping scenario for stage II of Urannah Dam, the likely water demands, and gross margins per ML are as follows:

Water Use & Total Agriculture Demand - Urannah Dam

Enterprise	Water Use ML/ha	Estimated Crop Area (ha)	Total Water Demand ML	Gross Margin per ML
Sugar Cane	13	9338	121394	$120 (avg)
Peanuts	6	402.5	2415	$147
Maize	7	402.5	2817.5	$23
Cotton	6	4669	28014	$222
Horticulture*	7.4	805	5957	1801
Redclaw	43.5	322	14007	$716
Lucerne	14	161	2254	$96
TOTAL		**16100**	**176858.5**	

Source: Burdekin Agroeconomic Study 1999

*Horticulture gross margin = average of potato, grapefruit, mandarins, table grapes

PROJECT STATUS & APPROVALS

The Urannah Dam project has not been formally approved by the QLD Government. It has been comprehensively assessed by the Burdekin Basin Water Planning Advisory Committee as part of the Burdekin Catchment Study, which was completed in June 2000 (as of April 2002 the final catchment study report has not been released by the Department of Natural Resources and Mines). The preliminary draft Catchment Study report recommended Urannah Dam as the highest priority water storage project in the Burdekin Catchment.

The Mackay Regional Water Resources Strategy Stage II (1998) recommended the priority development of the Urannah Dam scheme in the short term.

Much of the baseline information and assessment required to complete the concept development and enable an approval in principle to be granted has been collected as part of the Burdekin Catchment Study. These include:

- Preliminary engineering studies
- Scoping study
- Initial Environmental appraisal
- Soils assessment
- Benefit-Cost Analysis (consistent with Treasury Project Evaluation Guidelines)
- Economic analysis of likely agricultural development (Burdekin Agroeconomic Study)
- detailed hydrological modeling
- Initial cultural heritage & social assessments.

The remaining outstanding work that needs to be completed before the project can proceed to an Impact Assessment Study includes:

- Economic Appraisal to be completed – this requires the development of an Input/Output model for the Bowen Shire Region.
- Financial Appraisal to be completed – this will make an initial estimate of the CSO that may be required for the commercial viability of the project.
- Preparation of Initial Advice Statement to DSD.
- Development of Terms of Reference for Impact Assessment Study process.
- Conduct of Impact Assessment Study.

ECONOMICS

Development Costs

Construction cost estimates for the Urannah Dam have been based on designs and quantity assessments detailed by the Snowy Mountains Engineering Corporation report, 1978 "*Staged Construction of Urannah Dam*". Unit rates have been applied from the ARMS Element Listing Unit Rates Database (DNR), with cost estimates updated to August 1998.

The capital cost of stage I (863,000 ML capacity) is estimated at $113.1 million. The cost of Stage II (1.5 million ML) will take the total cost of the project to $149.3 M,

with a respective cost per ML stored of $131 and $100, and per ML yield $607 and $691 ($775 and $844 including environmental release).

These costs exclude the development of associated irrigation areas and on farm reticulation areas, assumed to be the responsibility of the ultimate water users.

Itemisation of Capital Costs - Urannah Dam

PROJECT DESCRIPTION	**STAGE I**	**STAGE II**
Full Supply Level	EL 278	EL 292
Storage Capacity	863,000 ML	1,500,000 ML
COST COMPONENT		
Embankment	46,452,062	63,567,977
Outlet and Diversion Works	5,148,966	5,046,237
Intake	1,352,645	1,792,403
Spillway	16,523,089	24,832,225
Total Contract Costs	**69,476,762**	**95,238,842**
Power Supply	957,000	957,000
Works costs	70,433,762	96,195,842
Site Allowance (5%)	3,521,688	4,809,792
Engineering (11%)	7,747,714	10,581,543
Management Expenses (6%)	4,226,026	5,771,751
Land Acquisition	638,000	638,000
Road relocation	11,800,000	11,800,000
Sub Total	**98,367,189**	**129,796,927**
Contingencies (15%)	14,755,078	19,469,539
TOTAL PROJECT COST	**$ 113,122,268**	**$ 149,266,466**

ECONOMIC BENEFITS

Gross Value of Annual Agricultural Production - Urannah Dam

Enterprise	Water Use ML/ha	Gross Income $/ha	Estimated Cropping Area (ha)	Gross Value $
Sugar Cane	13	$3,413	9338	$31,870,594
Peanuts	6	$2,275	402.5	$915,688
Maize	7	$1,170	402.5	$470,925
Cotton	6	$3,150	4669	$14,707,350
Horticulture*	7.4	$33,700	805	$27,128,500
Redclaw	43.5	$37,848	322	$12,187,056
Lucerne	14	$2,800	161	$450,800
TOTAL			**16100**	**$87,730,913**

Source: burdekin Agroeconomic Study 1999

*Horticulture gross icome = average of potato, grapefruit,mandarins,table grapes

As an indicator of potential for cropping in the Urannah Dam area, the 1998 farm gate horticulture returns for Bowen Shire were as follows:

1998 HORTICULTURAL STATISTICS BOWEN SHIRE			
VEGETABLES	**Area (ha)**	**Yield (tonnes)**	**Value ($M)**
Tomatoes	2200	73600	80
Capsicum and Chilli	800	21250	27.5
Beans	1250	7750	11.6
Rockmelons & Honeydew	600	14000	11.5
Sweetcorn	650	6500	7.8
Watermelon	275	12750	6.5
Pumpkins	125	2500	2.5
Eggfruit	80	1600	1.8
Zucchini	40	600	0.9
Squash	8	130	0.3
Cucumbers	100	2000	0.2
Okra	10	100	0.2
Total Vegetables	**6138**	**142780**	**150.8**
PLANTATION CROPS	**Area (ha)**	**Yield (tonnes)**	**Value ($M)**
Mangoes	95000 trees 600 ha	4500	7.8
Lychees	4000 trees 20 ha	N/A	N/A
Passionfruit	40 ha	N/A	N/A
Total Plantation Crops	**660**	**4500**	**7.8**
TOTAL HORTICULTURAL CROPS	**6798**	**147280**	**158.6**

BENEFIT – COST ANALYSIS & NET PRESENT VALUE CALCULATIONS

The economic assessments which have been completed as part of the ongoing Burdekin Basin Catchment Study is a relatively simple process based on determination of provisional Net Present Values (NPV).

The NPV analysis considers the estimated construction, distribution and maintenance costs, relative to the estimated gross margin of a suite of suitable crops grown over the developed area (detailed in the Burdekin Agroeconomic Study). Capital costs are assumed to be valued at total costs rather than a discounted time series.

The objective of the economic assessment competed to date has been to allow the intra-catchment comparison of different potential water projects rather than to determine accurate and detailed absolute economic viabilities for the projects. As such, the following costs and issues have not been encompassed in the analysis:

- the construction of new road infrastructure and services to support irrigation development activities;
- the proportion of public and private funds that the project may attract;
- the rate of development of the project;
- economic risk assessment;
- the ability to acquire the necessary lands (pastoral leases, land under native title claim)
- the financial compensation of claimants;
- quantifiable primary environmental costs and benefits;
- any quantifiable benefits other than those from irrigated agriculture (mining, power generation, urban & industrial uses, tourism etc).

It must be noted that the economic assessment below excludes any economic benefit from non-agricultural water use. The Urannah Dam would potentially supply up to 10,000 ML per annum for the further development of the Bowen Basin coal industry. This would be achieved by relieving Eungella Dam of commitments to the Collinsville township and the Collinsville Power Station, thus freeing up water to support development in Central Queensland via the two existing Eungella pipelines.

Urannah Dam may also supply additional water to enable the future expansion of the Collinsville Power Station (currently producing 180 MW baseline power). These non-agricultural water uses are excluded from the existing Benefit-Cost analysis, and additional work needs to be carried out to quantify this potential.

Net Present Value

The present value cost of Stage I (863,000 ML storage) is estimated at $185.5 M, compared to the present value benefit of $466.1M, leaving a net present value (NPV) of $280.6 M.

The present value cost of completing Urannah Dam to Stage II is $241.6M, with a present value benefit of $564.8M, leaving a NPV of $323.2M.

These NPV estimates are sensitive to discount and irrigation rate charges, embankment costs and yield estimates.

Urannah Dam - Economic Calculations for Storage Site Assessment

CROP RETURNS

Based on Burdekin Agroeconomic Study (DPI 1999)

Average Gross Margin	$/ha/a	Crop Proportion
Sugar Cane	$1,560	58%
Mixed Broad Acre*	$522	5%
Cotton	$1,332	29%
Horticulture (various)	$13,329	5%
Lucerne	$1,344	1%
Redclaw	$31,146	2%
Average/Ha	$2,620	100%

*Peanuts and Maize

RETICULATION COSTS

Based on Teemburra Creek Dam Project (DPI 1993)

Development Time	Reticultaion Costs $/ha	% Completed
0 to 5 years	$3,580	50%
5 to 7 years	$2,860	75%
7 to 10 years	$2,150	100%
Weighted Average	$3,043	

DEMAND/LOSSES/DISCOUNT

Reticulation Losses %	10%
In-stream Losses %	10%
Required application rate (ML/ha/a)	9.15
Actual Release (ML/ha/a)	11.3
Discount rate	6%
Maintenance % of Capital	2%
Contingencies price/Materials	10%

Project Description	Present Value (Storage only)	PV Costs	PV Benefits	NPV	Yield (ML/a) at Dam	Potential Area Irrigated (ha)
Urannah Stage I	$113,100,000	$185,483,446	$466,108,800	$280,625,354	146,000	12,925
Urannah Stage II	$149,300,000	$241,605,250	$564,757,855	$323,152,605	176,900	15,660

Source: Scoping Studyof Wtater Infrastructure Development Options and Related Issues in the Burdekin River Catchment, DNR, 1999, Vol. 3 Appendix C:1.4

Yield estimates at the dam use 85% monthly reliability and environmental release

Economic Benefit of Future Mining and Industrial Water Use From Urannah Dam

According to the Scoping Study of Water Infrastructure Options and Related Issues in the Burdekin Catchment (DNR, 1999), "Industrial Water demand is likely to increase significantly in response to increased energy resource development".

The existing Eungella Dam, upriver from the proposed Urannah Dam site, currently supplies water to the Bowen basin Coal fields via two existing pipelines. Eungella Dam is now fully allocated.

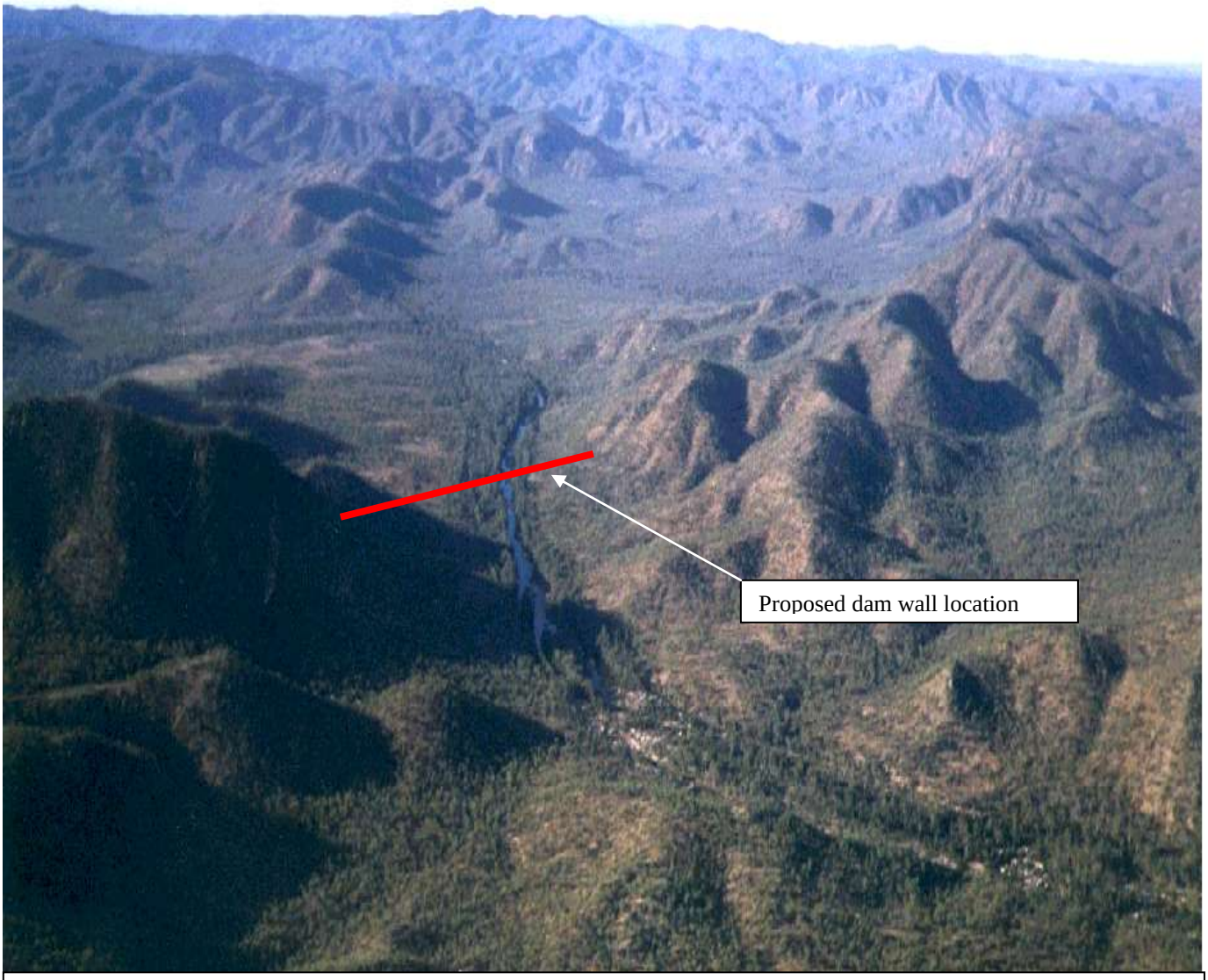
A total of 23,560 ML pa is allocated to the Bowen Basin coal industry and the Collinsville Power Station.

Any expansion of coal mining activity in the Bowen basin would require additional water supplies, which would exceed the capacity of the Eungella supply.

Similarly, an expansion in the generating capacity of the Collinsville Power Station would require additional water supplies. Indeed, Transfield NRG, the owner/operator of the power station have indicated they would prefer additional water to support their existing operation.

These industrial uses have a far higher propensity to pay for water than do agricultural users.

AERIAL PHOTOGRAPH – URANNAH DAM



Urannah dam site on the Broken River