

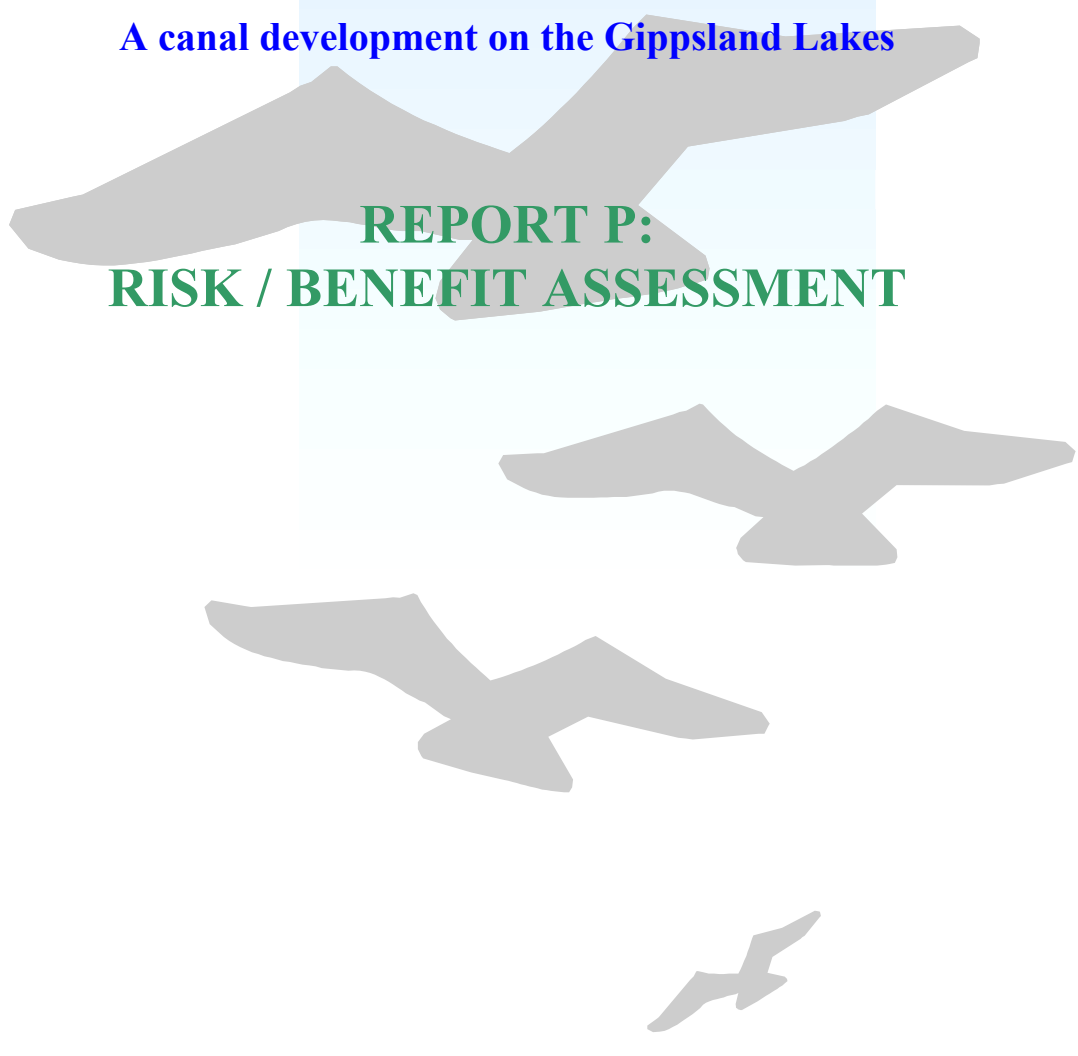


ENVIRONMENT EFFECTS STUDY

WELLINGTON WATERS

A canal development on the Gippsland Lakes

**REPORT P:
RISK / BENEFIT ASSESSMENT**





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1. INTRODUCTION

As part of the EES Report we have conducted an independent risk/benefit assessment of the project. The team that have conducted this assessment include:

- Professor John Wilson; Head of Environmental Engineering, Melbourne University
- Mark Roberts; Project Leader, Environmental Risk Management, Coomes Consulting Group
- Leon Gardiner; Director, DLIQ Certification Services (Registered with JASANZ to certify environmental risk management systems to ISO 14001)

The assessment has been carried out within the guidelines set out in *The West Gippsland Regional Catchment Strategy*. These guidelines set out the:

- *Benefit and Risk Assessment Criteria*
- *Consequence Rating Criteria*
- *Likelihood Rating Criteria*

These criteria are listed behind the Risk and Benefit Analyses.

The Assessments considered the project as designed and presented in the accompanying EES Report. For example, when dealing with the risk of effluents seeping into the watertables it was considered on the basis that septic tanks were not to be used and all black and grey water would be treated in accordance with the proposal to category A standard through a treatment plant and be recycled.

The following tables set out the results of this assessment.





RISK ANALYSIS



Risk Analysis

Carry out a risk analysis for each impact you have selected.

Activity / Aspect / Impact	Probability	Consequence		Risk
1. Earthworks				
1.1 Distruption of Area				
1.1.1 Erosion of unprotected areas	Possible	Minor	6	MINOR
1.1.2 Damage to flora	Inevitable	Major	50	MODERATE
1.1.3 Damage to fauna	Rare	Insignificant	1	MINOR
1.2 Noise Generation				
1.2.1 Discomfort to residents and employees	Rare	Insignificant	1	MINOR
1.3 Dust Generation				
1.3.1 Discomfort to residents and employees	Unlikely	Minor	4	MINOR
1.3.2 Erosion of unprotected areas	Unlikely	Minor	4	MINOR
1.4 Dust Control and Suppression (water restrictions)				
1.4.1 Consumption of natural resource	Rare	Insignificant	1	MINOR
1.5 Spillage of fuel / chemicals				
1.5.1 Contamination of air / water / soil	Possible	Minor	6	MINOR
1.5.2 Risk to human health	Possible	Minor	6	MINOR
1.6 Reshaping Topography				
1.6.1 Erosion of soil	Unlikely	Minor	4	MINOR
1.6.2 Discomfort to residents and employees (dust)	Unlikely	Minor	4	MINOR
1.7 Removal of vegetation				
1.7.1 Erosion of soil	Rare	Insignificant	1	MINOR
1.7.2 Loss of natural habitat	Inevitable	Major	50	MODERATE
1.8 Increase sediment load				
1.8.1 Contamination of waterways	Possible	Major	30	MODERATE
1.8.2 Damage to flora and fauna	Unlikely	Severe	10	MINOR
1.8.3 Loss of amenity (beneficial uses)	Unlikely	Minor	4	MINOR
1.9 Potential impact on flora / fauna, archaeological / heritage sites and waterways				
1.9.1 Loss of biodiversity	Unlikely	Minor	4	MINOR

1.9.2	Loss of amenity	Unlikely	Minor	4	MINOR
1.9.3	Damage to archaeological / heritage items of significance	Possible	Severe	15	MINOR
1.10	Storage and use of fuel				
1.10.1	Contamination of air / water / soil	Unlikely	Minor	4	MINOR
1.10.2	Risk to human health	Possible	Minor	6	MINOR
2. House Construction					
2.1	Noise / vibration generation (e.g. machinery, vehicles and blasting)				
2.1.1	Discomfort to residents and employees	Unlikely	Minor	4	MINOR
2.2	Dust generation				
2.2.1	Discomfort to residents and employees	Unlikely	Minor	4	MINOR
2.3	Road / vehicle cleaning				
2.3.1	Contamination of waterways	Rare	Severe	5	MINOR
2.4	Generation of waste (building, contaminated material or soil)				
2.4.1	Use of landfill	Unlikely	Minor	4	MINOR
2.4.2	Potential pollution	Unlikely	Minor	4	MINOR
2.4.3	Habitat loss	Rare	Minor	2	MINOR
3. Acid Sulphate Soils					
3.1	Release of Acid				
3.1.1	Increase acidity to lakes	Possible	Major	30	MODERATE
3.1.2	Increase acidity to Water Table	Possible	Major	30	MODERATE
3.2	Engineering Construction Management				
3.2.1	Treatment Methodology	Likely	Minor	8	MINOR
4. Effluent					
4.1	Sewerage Treatment				
4.1.1	Waste entering waterways	Possible	Major	30	MODERATE
4.1.2	Waste entering watertables	Possible	Minor	6	MINOR
4.2	Stormwater Dispersal				
4.2.1	Waste entering waterways	Possible	Minor	6	MINOR
4.2.2	Waste entering watertable	Likely	Minor	8	MINOR
5. Chemical Storage					
5.1	Spillage				

5.1.1	Spillage entering waterways	Possible	Severe	15	MINOR
5.1.2	Spillage entering watertables	Unlikely	Severe	10	MINOR
6.Canals					
6.1	<i>Water Quality</i>				
6.1.1	Spillage	Possible	Severe	15	MINOR
6.1.2	Nutrient loads	Possible	Minor	6	MINOR
6.1.3	Algal Bloom	Possible	Major	30	MODERATE
6.2	<i>Underground Aquifers</i>				
6.2.1	Recharge / Discharge	Unlikely	Minor	4	MINOR
7.Adjacent RAMSAR Site					
7.1	<i>Increase Boating</i>				
7.1.1	Noise Disturbance	Likely	Minor	8	MINOR
7.2	<i>Flood Regime</i>				
7.2.1	Effect of development on natural floods	Unlikely	Minor	4	MINOR
8.Local Government Expenditure					
8.1	<i>Infrastructure development</i>				
8.1.1	Costs greater than returns	Unlikely	Severe	10	MINOR
9.Project Failure					
9.1	<i>Inadequate Sales</i>				
9.1.1	Developer incurs loss	Unlikely	Severe	10	MINOR





BENEFIT ANALYSIS



Benefit Analysis

Carry out a benefit analysis for each impact you have selected.

Activity / <i>Aspect</i> / Impact	Probability	Consequence		Benefit
1. Canals				
1.1 <i>Aquatic habitat</i>				
1.1.1 Creation of new fish breeding areas	Inevitable	Outstanding	100	MAJOR
1.2 <i>Fire</i>				
1.2.1 Reduce fire risk (water storage)	Inevitable	Major	50	MODERATE
1.2.2 Reduce spread of wild fire	Inevitable	Outstanding	100	MAJOR
1.3 <i>Aesthetics</i>				
1.3.1 Enhanced environmental living zone	Inevitable	Outstanding	100	MAJOR
1.4 <i>Protective barrier</i>				
1.4.1 Protection of wildlife refuges	Inevitable	Outstanding	100	MAJOR
2. Wildlife Refuge				
2.1 <i>Control exotic flora and fauna</i>				
2.1.1 Eradication of feral animals	Inevitable	Outstanding	100	MAJOR
2.1.2 Removal of noxious weeds	Inevitable	Outstanding	100	MAJOR
2.1.3 Adding to the biodiversity	Likely	Major	40	MODERATE
2.1.4 Protection of threatened species	Possible	Major	30	MODERATE
2.2 <i>Removal of stock</i>				
2.2.1 Improvement of biodiversity	Inevitable	Outstanding	100	MAJOR
2.2.2 Improvement of RAMSAR habitat	Likely	Outstanding	80	MAJOR
2.2.3 Extension of RAMSAR wetlands	Inevitable	Major	50	MODERATE
2.3 <i>Threatened species</i>				
2.3.1 New protected animal habitat	Inevitable	Major	50	MODERATE
2.3.2 Introduction of threatened species	Inevitable	Outstanding	100	MAJOR
2.4 <i>Education</i>				
2.4.1 Local wetland resource centre	Likely	Major	40	MODERATE
2.5 <i>Reversal of Degradation / Salination</i>				
2.5.1 Improvement in habitat and biodiversity	Likely	Outstanding	80	MAJOR

2.6 Lake Wellington aspect					
2.6.1	Maintain natural visual aesthetics from Lake	Likely	Moderate	20	MINOR
2.7 Protection of Biodiversity					
2.7.1	Education opportunities	Likely	Major	40	MODERATE
2.7.2	Tourist Attractions	Likely	Major	40	MODERATE
3. Water Management					
3.1 Water Recycling					
3.1.1	Self Sufficiency of water supply	Inevitable	Major	50	MODERATE
3.2 Irrigation					
3.2.1	Nutrients utilised in agriculture	Likely	Moderate	20	MINOR
3.2.2	No impact on external environment	Likely	Moderate	20	MINOR
4. Employment					
4.1 Short term					
4.1.1	Civil Construction	Inevitable	Outstanding	100	MAJOR
4.1.2	Housing Construction	Inevitable	Outstanding	100	MAJOR
4.1.3	Flow on factor	Inevitable	Outstanding	100	MAJOR
4.2 Long term					
4.2.1	Retail	Inevitable	Outstanding	100	MAJOR
4.2.2	Servicing	Inevitable	Outstanding	100	MAJOR
4.2.3	Hospitality	Inevitable	Outstanding	100	MAJOR
5. Tourism					
5.1 Boating					
5.1.1	Destination point	Inevitable	Major	50	MODERATE
5.1.2	Fuel supply	Inevitable	Moderate	25	MINOR
5.1.3	Overnight moorings	Inevitable	Moderate	25	MINOR
5.1.4	Provision of Wet Berths	Inevitable	Outstanding	100	MAJOR
5.1.5	General Provisions	Inevitable	Major	50	MODERATE
5.1.6	Sewerage pump out station	Inevitable	Major	50	MODERATE
5.1.7	Servicing and repairs	Inevitable	Major	50	MODERATE
6. Public Safety					
6.1 Boating					
6.1.1	Safe harbour on Lake Wellington	Inevitable	Outstanding	100	MAJOR
7. Short Term Growth					

7.1 Civil Construction					
7.1.1	Work for contractors	Inevitable	Outstanding	100	MAJOR
7.1.2	Supply of materials	Inevitable	Minor	10	MINOR
7.1.3	Servicing of contractors	Inevitable	Minor	10	MINOR
7.2 Housing Construction					
7.2.1	Work for contractors	Inevitable	Outstanding	100	MAJOR
7.2.2	Supply of materials	Inevitable	Outstanding	100	MAJOR
7.2.3	Servicing of contractors	Inevitable	Moderate	25	MINOR
8. Long Term Growth					
8.1 Rate income to council					
8.1.1	New revenue stream	Inevitable	Outstanding	100	MAJOR
8.2 Service industries to Wellington Waters					
8.2.1	Retail growth to region	Inevitable	Outstanding	100	MAJOR
8.2.2	Boating sales	Inevitable	Major	50	MODERATE
8.2.3	Boat servicing	Inevitable	Minor	10	MINOR
8.3 Tourism					
8.3.1	Visitors to Wellington Waters	Inevitable	Major	50	MODERATE
8.3.2	Improvement of Port of Sale development	Possible	Minor	6	MINOR
8.3.3	Flow on effect to whole Gippsland Lakes region	Likely	Outstanding	80	MAJOR



4. CONCLUSION

General

The risks identified and the benefits established are based on an assessment of the details and information contained in the Environmental Effects Statement for the Wellington Waters Project. Details of the Assessment Criteria and Risk Ranking are attached. These are consistent with the West Gippsland Regional Catchment Authority.

Risks

The results of this assessment demonstrate that the Project does not create catastrophic nor major risks to the environment. There are no sociological or economic risks evident which could adversely affect the region. The risks to the environment are only minor (37) or moderate (7). Each of these is manageable as “Action Items” in the accompanying Environmental Management Plan (EMP).

The inclusion of Action Items in the EMP is in accordance with Australian and international best practice management system (ISO 14001:1996) requirements to assure that these minor and significant risks are controlled throughout the development and operation of the Project.

Benefits

The major benefits to the Project covered the environment (10), sociological benefits (8) and the economic benefits (6). These are very significant and positive outcomes from the Project. It is evident that there are in all 40 benefits arising from the Project and that most of these (24) benefits provide an outstanding contribution to the region.

Recommendations

Risks Action Items: That the few minor/moderate Action Items are included in the EMP.

Benefits: That the environmental, sociological and economic benefits are effectively communicated.





RATING CRITERIA



Environmental Risk

a) Probability (Frequency) rating

How likely is it that the identified impact will occur?

Occurrence	Explanation	Rating
Inevitable	Will definitely occur.	5
Likely	Will probably occur.	4
Possible	Will occur on some occasions.	3
Unlikely	Could occur on occasion.	2
Rare	Will only occur in extraordinary circumstances.	1

b) Consequence rating

Independent of the probability of the event occurring, what would the likely environmental impact be if it did?

Consequences	Explanation	Rating
Catastrophe	A disaster that could lead to significant permanent damage to the environment.	20
Major	Critical impacts that can only be rectified / overcome if addressed with non-routine management actions (e.g. major rehabilitation / outside help required).	10
Severe	Significant impacts that can mostly be managed with routine management procedures, but may require some additional effort.	5
Minor	Adverse impacts, which can be readily absorbed by environment and dealt with by applying routine procedures.	2
Insignificant	Impact on environment hardly worth worrying about.	1

Social Risk

a) Probability (Frequency) rating

How likely is it that the identified impact will occur?

Occurrence	Explanation	Rating
Inevitable	Event will occur.	5
Likely *	Event will probably occur in most circumstances or is occurring.	4
Possible *	Event could occur at some time.	3
Unlikely *	Event could occur at some time but is not expected.	2
Rare	Event is not likely to occur	1

b) Consequence rating

Consequences	Explanation	Rating
Catastrophe	Absolutely unacceptable.	20
Major	High level of public concern and / or loss of public support.	10
Severe	Consistent local concerns and / or loss of support from some sectors within wider communities.	5
Minor	Some effect on local public facilities.	2
Insignificant	Acceptable. No impact.	1

Economic Risk

a) Probability (Frequency) rating

How likely is it that the identified impact will occur?

Occurrence	Explanation	Rating
Inevitable	Event will occur.	5
Likely	Event will probably occur in most circumstances or is occurring.	4
Possible	Event could occur at some time.	3
Unlikely	Event could occur at some time but is not expected.	2
Rare	Event is not likely to occur.	1

b) Consequence rating

Ongoing economic loss to the region.

Consequences	Explanation	Rating
Catastrophe	Over \$1 million per annum.	20
Major	\$500,000 to \$1 Million	10
Severe	\$100,000 to \$500,000	5
Minor	\$50,000 to \$100,000.	2
Insignificant	Up to \$50,000.	1

Environmental Benefit

a) Probability (Frequency) rating

How likely is it that the identified impact will occur?

Occurrence	Explanation	Rating
Inevitable	Will definitely occur.	5
Likely	Will probably occur.	4
Possible	Will occur on some occasions.	3
Unlikely	Could occur on occasion.	2
Rare	Will only occur in extraordinary circumstances.	1

b) Consequence rating

Independent of the probability of the event occurring, what would the likely environmental impact be if it did?

Consequences	Explanation	Rating
Outstanding	Significantly and permanently enhances the biodiversity and sustainability of the region.	20
Major	Positively enhances the biodiversity and sustainability of the region.	10
Moderate	Enhances individual elements of the local biodiversity.	5
Minor	Reduces the current rate of degradation to the biodiversity and sustainability of the region.	2
Insignificant	No change.	1

Social Benefit

a) Probability (Frequency) rating

Occurrence	Explanation	Rating
Inevitable	Event will occur.	5
Likely	Event will probably occur in most circumstances or is occurring.	4
Possible	Event could occur at some time.	3
Unlikely	Event could occur at some time but is not expected.	2
Rare	Event is not likely to occur	1

b) Consequence rating

Consequences	Explanation	Rating
Outstanding	The development has a positive impact on the State, Regional and Local communities.	20
Major	The development achieves wider community benefits.	10
Moderate	Enhances individual community and public facilities.	5
Minor	Minor benefit to local public facilities.	2
Insignificant	Little to no impact.	1

Economic Benefit

a) Probability (Frequency) rating

Occurrence	Explanation	Rating
Inevitable	Event will occur.	5
Likely	Event will probably occur in most circumstances or is occurring.	4
Possible	Event could occur at some time.	3
Unlikely	Event could occur at some time but is not expected.	2
Rare	Event is not likely to occur.	1

b) Consequence

Consequence	Explanation	Rating
Outstanding	Development will facilitate long-term economic growth for regional industries and enterprises. Over \$1 million per annum.	20
Major	Development will facilitate economic growth for regional industries and enterprises. Over \$1 Million.	10
Moderate	\$250,000 to \$1 Million	5
Minor	\$50,000 to \$250,000	2
Insignificant	Up to \$50,000	1