Submission to Queensland Coordinator General:

Great Keppel Island Resort Environmental Impact Statement:

Chapter 5, Economies and Management of Impacts

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Executive summary

The Capricorn Conservation Council is making a submission to the Queensland Coordinator General on the Great Keppel Island Revitalisation Plan Environmental Impact Statement. As part of their submission they have asked Economists at Large to undertake a pro bono a review of the economic impacts of the project as presented by the proponent in *Chapter 5: Economies & Management of Impacts.*

This report presents the findings of this expert review that looks at the adequacy and robustness of the economic case presented by Tower Holdings to justify this extensive resort redevelopment.

Our review has highlighted a number of areas where we conclude there have been inadequate analysis undertaken, using inappropriate economic assessment tools, and providing insufficient information to know the final balance of benefits to costs of this project.

We have found a number of limitations of the source report informing the EIS (by Foresight Partners) relating primarily to:

- the lack of a full cost-benefit analysis undertaken on the project, meaning the economic benefits have been presented and the costs ignored, and
- the inappropriate use of input-output (I-O) modelling using old data providing an assessment of economic impact that is outdated and difficult to have confidence in.

While the economic findings in the EIS are for the most part reasonable in what they present, the omission of a full assessment of both the economic benefits and the costs result in an incomplete economic analysis with the potential for significantly overstating benefits and ignoring costs.

We therefore conclude that due to the reasons set out in this report, there is insufficient economic information provided by the proponent for decision makers to be fully informed of the benefit cost ratio of this project.

In our opinion, therefore, we would caution decision makers from giving this project an approval based on the current level of economic assessment, and would encourage a more complete assessment of potential costs as well as benefits be undertaken.

Introduction

Great Keppel Island (GKI) lies off the central Queensland coast and is located in the Rockhampton Regional Council. Tower Holdings Pty Ltd have proposed a $592.5 million tourism redevelopment of the island, comprising a 4 or 5 star hotel, 300 tourism apartments, 750 resort villas, a 250 slip marina and yacht club, 105 staff accommodation units, an 18 hole golf course and country club, 3,000m^2 of restaurants, cafés, bars and retail space as well as an upgrade to the existing airstrip and terminal.

Tower Holdings purchased about 80% of GKI in 2006 and submitted two earlier development proposals which did not receive the support of either the residents of Central Queensland or the Environmental Department (Sharp, 2009). The third and current proposal was submitted in early 2010, which the federal Tourism Minister gave his support for in February 2012 (Allen, 2012).

Consultants *Foresight Partners* were engaged by Tower Holdings to prepare a forecast of the regional economic impact arising from the proposed development works on GKI. That Foresight Partners report was the primary source for the economic material presented in section *5.1.2 Potential Impacts and Mitigation Measures* of the GKI Revitalisation Plan Environmental Impact Statement (EIS). The *Foresight Partners* original report is included in Appendix AC of the EIS.

The Capricorn Conservation Council is making a submission on the GKI Revitalisation Plan EIS and as part of their submission they have asked Economists at Large to review *Chapter 5: Economies & Management of Impacts* to provide an expert view on the robustness of the economic case presented by Tower Holdings to justify this extensive resort redevelopment.

This report outlines the findings of that review.

Lack of Cost-Benefit Analysis

The economic assessment of the GKI Revitalisation Plan contained in section *5.1.2 Potential Impacts and Mitigation Measures* of the EIS is based solely on input-output analysis, and contains no benefit-cost analysis (BCA).

A BCA involves evaluating the net benefit from a proposed project from the perspective of the community as a whole (Department of Finance and Deregulation, 2011). In order to obtain an accurate value for the *net benefit* of a project, all associated costs must be subtracted from the discounted value of future income streams that the project are likely to generate. The costs being evaluated in a BCA should not be purely financial either; they must also include effects on environmental, heritage, cultural and social factors, all of which can generally be economically quantified.

Failure to include a detailed BCA in an economic impact report leaves open the potential that the benefits of the project are presented in full whilst the costs are underdeveloped or absent altogether, which was apparent in *Chapter 5* the GKI Revitalisation Plan EIS.

The Queensland Department of Infrastructure and Planning agree the use of BCA is the most suitable economic analysis to assess major projects, and recommend it as the preferred method of analysis over input-output (I-O) modelling. They have stated:

> *The primary method of economic evaluation of public sector policies and projects is cost-benefit analysis. Input-output methodology (or the use of multipliers) is not a preferred methodology for economic evaluations.* (Qld DIP 2011, p18)

We would argue that when a government agency is charged with assessing the benefits and costs of a privately managed project on a region, such as the GKI development, private sector projects should also use a cost-benefit analysis. Agreement in the preferential use of BCA over I-O analysis is consistent across the majority of the economics profession, see for example (Dobes, Leo and Bennett 2009; Ergas 2009; Abelson 2011) and many others. It is important to understand the difference between these two forms of analysis.

As the Department of Infrastructure and Planning explains:

> [Cost-benefit analysis should] *comprehensively identify and estimate as many costs and benefits of a project as can reasonably be measured, including those which can be thought of as social and environmental,* [in order] *to rank project options according to their net economic benefit.* (p18)

Whereas economic impact assessment, such as Input-Output modelling:

> *typically measures the impact of a project on the volume of economic activity in a region (e.g. on gross domestic product or employment),* (Qld DIP 2011, p23)

The Treasury of NSW has concluded similarly confirming these interpretations:

> *Model based economic impact assessment is not a substitute for a thorough economic analysis of a policy. The appropriate method for analysing policy alternatives is benefit cost analysis (BCA). BCA considers the best use of resources and as such treats labour inputs as a cost. An I-O based economic impact analysis is best seen as a complement to a BCA and does not provide evaluative guidance. An I-O model will estimate flow on impacts irrespective of the qualities of the policy triggering those impacts.* (NSW Treasury 2009, p4)

Project Costs

Since *Chapter 5: Economies and Management* does not contain a benefit-cost analysis, many of the costs which should have been included in the project evaluation have been omitted.

One such obvious cost resulting from the GKI development project is the impact on the marine and terrestrial environment. In particular, a full assessment of the lost ecosystem values that will occur due to the land clearing for the golf course and general expansion of the resort zone detailed in the EIS should have been estimated. Some general points to keep in mind when considering the value of any ecosystem have been collated by Mass Audubon group (2003). They are:

1. Climate value: capture and storage of carbon dioxide by forest and other plant cover, reducing global warming.
2. Freshwater regulation and supply value: storage, control, and release of water by forests and wetlands, providing local supply of water.
3. Waste assimilation value: filtering of pathogens and nutrients from runoff by forests and wetlands, reducing the need for water-treatment systems.
4. Nutrient regulation value: cycling of nutrients, such as nitrogen, through ecosystem for usage by plants, reducing need to apply fertilizers.
5. Habitat refugium value: contiguous patches of forest and wetland in supporting a diversity of plant and animal life.
6. Soil retention and formation value: creation of new soils and prevention of erosion, reducing the need for dredging and mitigation of damage due to siltation of rivers and streams.
7. Disturbance prevention value: mitigation of flooding and coastal damage by natural wetlands and floodplains.
8. Pollination value: services provided by natural pollinators such as bees, moths, butterflies, and birds, avoiding need for farmers to import bees for crop pollination.
9. Recreation and aesthetics value: recreational value of natural places as well as positive impact on nearby property values.

Clearly not all of these factors will apply to the ecosystem value per hectare of GKI, however, most of these values (except perhaps pollination value) are likely to be relevant and quantifiable.

The economic assessment presented in this EIS fails to mention any such environmental costs associated with the land clearance for construction, the golf course or the marina development, which aside from representing an inadequate economic impact assessment, results in a perception that the project will cause no economic costs.

The value of cleared land is just one example of an environmental cost which should have been included in a comprehensive economic assessment, with many others likely if the consultants had undertaken a comprehensive economic assessment of the project, rather than merely presenting half of the ledger of benefits, but not costs.

For a more full discussion of environmental impacts of this project, we refer to the extensive work undertaken by the Capricorn Conservation Council, including the submission by Dr Alison Jones from the Centre for Environmental Management, Central Queensland University (http://www.cccqld.org.au/docs/gki_plan3/GKI_CCC_subm_EPBC_plan3_15Jun2010.pdf). Many of the environmental impacts such as those outlined in the document linked above should be included and quantified in a full assessment of costs and benefits of this development.

Understanding I-O Analysis

Input-output models describe how different industries in an economy are linked. Each industry in an economy is linked to other industries – they buy goods and services for their own production and also sell their products as inputs to other industries. Households are the consumers of final goods and supply labour to all industries. If all these links are understood, an I-O model can calculate how a change in the outputs of a specific industry affects the output of all industries in an economy. In the case of the GKI development, an increase in the activity of the construction industry will increase the construction industry's demand for labour and other goods and services from other industries. This cumulative effect of increased demand on other industries is known by economists as the *multiplier effect*.

In I-O modelling, each industry produces an amount known as its *final output*, which represents the amount that was sold to end users (households or exports). Industries also produce *intermediate* production, which are goods and services consumed as inputs by other industries. The sum of *final output* and *intermediate output* is defined as the *total output* of an industry, or put differently; *final output* is equal to *total output* less *intermediate output*.

The *intermediate output* is represented in I-O modelling as a matrix multiplication of a table of multipliers with the *total output* of other industries in the economy. For an economy containing many industries, all of which are interrelated, a coefficient, or multiplier, must exist for the relationship between every industry present. The complete equation is then written as such:

$$\begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} - \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

Where y_i is the *final production* of industry i, x_i is the *total production* of industry i, and a_{ij} is the multiplier coefficient between industries i and j; the amount by which increases in industry i affect industry j.

The matrix equation can be rearranged to:

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix}$$

So that *total production* is the subject. Here, the sum of x_1 to x_n represents the total production of an economy. If an increase in the final production of industry 1, say construction (Δy_1), is imputed into the above equation, the sum of x_1 to x_n will generally increase by an amount greater than Δy_1 itself, hence the multiplier effect.

It is not necessary for the general observer to understand matrix algebra. What is important is to understand that the change in an industry can have a greater effect on the local economy, which is estimated through the coefficients that link the industries. The derivation of these coefficients is all-important to the accuracy of the model. The accuracy of the results produced by an input-output model can only be as good as the coefficients which have been developed to model the inter-industry dependencies. Each area within the national economy has different coefficients between industries to the national data. In order to have an accurate model on an economic region, the coefficients must accurately reflect the relationship between industries in that region (BRS 2005).

I-O Analysis of GKI Development

The economic assessment of the GKI development proposal contained in section 5.1.2 of the GKI Revitalisation EIS was modelled using input-output analysis. In this method, the impact of an increase in construction activity was observed on the Gross Regional Product (GRP) for Fitzroy SD. The table's inter-industry coefficients, or multipliers, used in this analysis were those published by the Office of Economic and Statistical Research (OESR). The multiplier tables reflected the economy of the Fitzroy SD region.

It is positive to see that the I-O analysis performed by consultants *Foresight Partners* used multiplier tables from the region of Fitzroy SD only, as opposed to those for all Queensland or even Australia. This is because regional economies contain a higher degree of specialisation and generally rely more heavily on external suppliers than the national economy (Bureau of Rural Sciences, 2005).

On the other hand, the multiplier tables used were those published by the OESR in 1996-1997, making them 15 years out of date at the time of the analysis. This presents a modelling problem if the inter-dependencies of industries within a regional economy are found to have changed significantly since the multiplier tables were published.

To understand the changes the Fitzroy region had gone through during this time, we compared employment by industry data from the Australian Bureau of Statistics (ABS) Fitzroy Census for 1996 and 2006. The results showed that over this 10 year period, the make-up of the local economy (as shown by employment data) had changed significantly. This leads us to conclude that the use of 1996-1997 multiplier tables would present a distinctly different result than if multipliers were defined for the local economy of the region today.

Figure 1 below shows that the distribution of employment in most industries have changed substantially between the 1996 and 2006, indicating a shift in the main industries with which Fitzroy residents are employed, and more importantly a shift in the inter-dependences of those industries on each other.

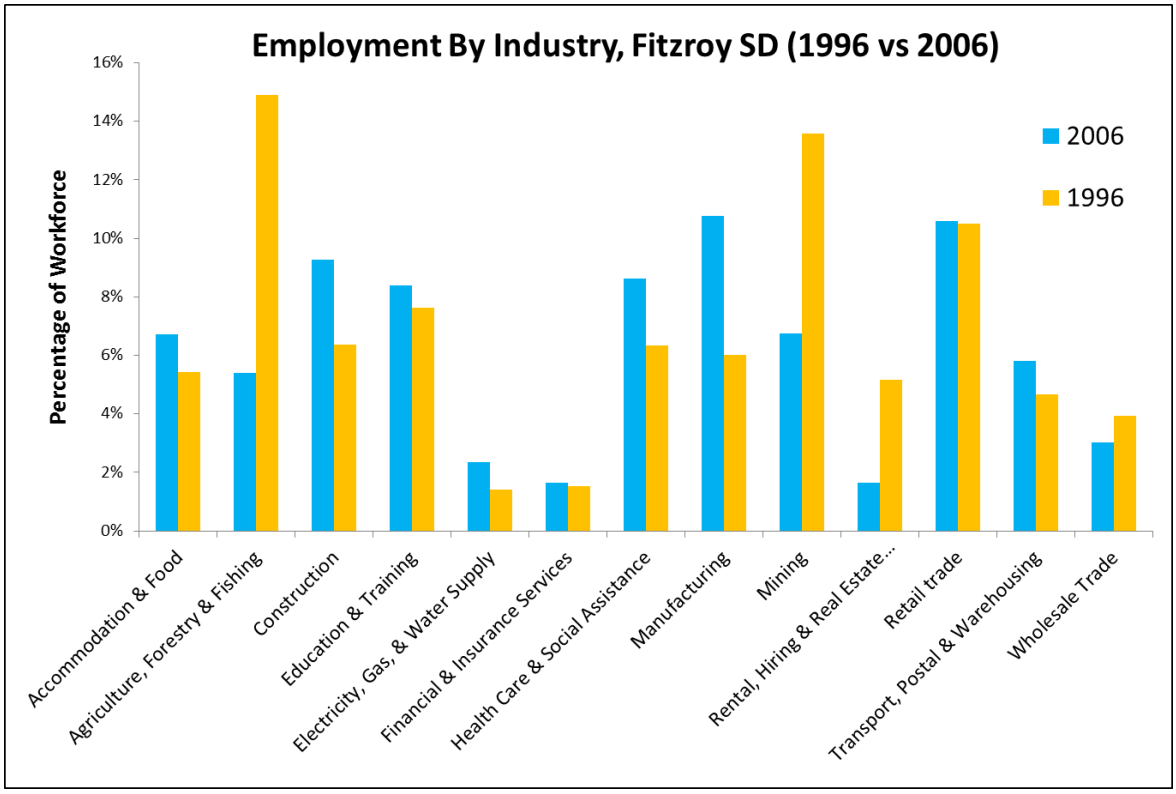

Figure 1 – Comparison of employment by industry data between 1996 and 2006 (ABS Fitzroy Census, 1996, 2006).

Regardless of how well predicted the construction costs associated with the GKI development project are, if the multiplier tables used to model the economic impact of this activity represent a fundamentally different regional economy than what actually exists, it is difficult to have much faith in what the model presented for this EIS shows.

While we concede that the predictions given in Table 5.10 *Estimated Economic Impact on GRP, Fitzroy SD*, in the GKI Revitalisation EIS do not seem unreasonable, we believe it is poor modelling practice to use such out dated multiplier tables. We also note that the Foresight Partners state clearly that they use these out of date figures as they are the most recent available regional data, however this only strengthens our argument that cost benefit analysis would have been the preferred, and more accurate method to assess economic impacts of this project.

Limitations of I-O

The use of I-O analysis has also been discouraged by the ABS, who has stated:

> *Production of multipliers was discontinued with the 2001–02 issue for several reasons. There was considerable debate in the user community as to their suitability for the purposes to which they were most commonly applied, that is, to produce measures of the size and impact of a particular project to support bids for industry assistance of various forms.* (ABS 2011)

This may explain why the most recent multiplier tables available for the Fitzroy SD region were from 1996-1997. The ABS goes onto discuss some of the reasons why I-O analysis is considered inappropriate for economic analysis:

> ***Lack of supply–side constraints:*** *The most significant limitation of economic impact analysis using multipliers is the implicit assumption that the economy has no supply–side constraints. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.*
>
> ***Fixed prices:*** *Constraints on the availability of inputs, such as skilled labour, require prices to act as a rationing device. In assessments using multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. Prices are assumed to be unaffected by policy and any crowding out effects are not captured.*

While it is noted that the scale of the construction activity on GKI is unlikely to have large supply side effects in the employment market or price effects in other markets, it should nonetheless be considered as a downside risk. In the absence of any of these negative considerations, the economic assessment presented appears to lose its impartialness. I-O analysis as a sole method for analysing projects will show that all expenditures are benefits, and that those benefits have flow on benefits to the wider economy. As Abelson put it:

> *I–O models lack resource constraints and fail to capture significant welfare (consumer and environmental) impacts. They always produce a positive gain to the economy, however disastrous the event.*

It is for these reasons that we conclude that input-output analysis is the wrong form of economic analysis to predict the total balance of both costs and benefits of this project. We are forced to conclude that the economic impacts reported in the EIS give only part of the full picture of the impact of this project, with the potential to massively overstate the benefits and underplay the costs.

Other Observations

The economic assessment provided in the GKI Revitalisation EIS presents an inconsistent and patchy explanation of how many of the forecasted impacts on the regional economy are actually calculated.

In some cases, we observed estimates that were derived straight out of the I-O analysis, whereas others appear to be simply the estimates of the consultants with little explanation. This applies to consultant's estimates of future visitor numbers, occupancy rates and expected expenditures, as well as the estimates of additional flow on jobs as a result of this project. This again gives us a lack of confidence in the net impact as presented, as the lack of explanations of how all estimates were calculated made it impossible to recreate all values.

In addition, the economic benefits claimed for the construction and operational phase of the project appear to not be discounted in the Foresight Report. Again, a lack of detailed explanation makes it hard to assess the adequacy of the data presented, however if these are not discounted as we suspect, this again represents poor economic practice and gives an artificially high value of benefits, since it is considering a dollar spent in the twelfth year of construction to be equal to one spent in the first year. A more robust economic analysis would discount the sum of benefits at an appropriate rate to ascertain a net present value of the future stream of benefits.

Conclusion:

In conclusion, our examination of the economic analysis presented within the EIS has highlighted a number of concerns as outlined above. This leads us to conclude that there is insufficient economic analysis to ascertain whether this project will in fact deliver a net benefit to the local region and more broadly to the state of Queensland.

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