

**The Economic Impacts  
Of Fixed Links And Enhanced Ferry Services  
In The Highlands & Islands**

**Final Report**

**To**

**Highlands & Islands Enterprise**



**May 2007**

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## 1 **INTRODUCTION**

This is the final report for research into the economic impacts of fixed links and enhanced ferry services in the Highlands & Islands. It was undertaken on behalf of Highlands & Islands Enterprise (HIE) during April and May 2007.

### 1.1 **OBJECTIVES**

The objectives of the research were to:

- Examine existing evidence regarding the impacts of transport investment in the Highlands & Islands. This was to focus on the more remote parts of the region where transport infrastructure and services tend to be less well developed; and
- Based on the review of evidence, identify and analyse a number of issues relating to the appraisal of transport projects in more remote parts of the Highlands & Islands.

### 1.2 **METHOD**

The research was undertaken through:

- A review of existing research reports that have evaluated the impacts of transport projects in the Highlands & Islands.
- Where possible, updating these reports with data on recent traffic flows.
- A brief review of general literature on the appraisal of the impacts of transport projects.
- Discussions with staff of HIE and HITRANS.

### 1.3 **STRUCTURE**

**Chapter 2** reviews available evidence on the effects of transport investments, in terms of both traffic generation and economic and social impacts. **Chapter 3** considers the implications of the review of evidence for appraisal of similar, future projects.

The **Appendix** contains a bibliography of the reports reviewed for this research.

## 2 REVIEW OF EVIDENCE

### 2.1 INTRODUCTION

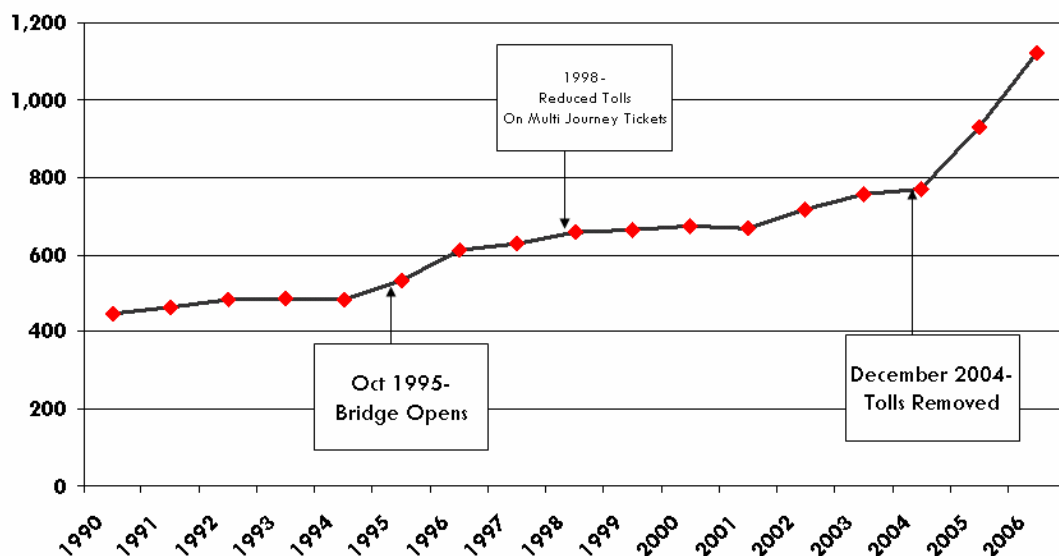
This Chapter reviews available evaluation evidence regarding the impacts of fixed links and new/enhanced ferry services in the Highlands & Islands. For both types of transport project the Chapter examines: uplift in demand for travel; and economic and social impacts of the improved transport provision.

### 2.2 UPLIFT IN DEMAND: FIXED LINKS

#### 2.2.1 Skye Bridge

**Figure 2.1** shows the changes in vehicle demand for travel between the mainland at Kyle of Lochalsh and Skye over the period 1990-2006. This encompasses "before" and "after" the opening of the Skye Bridge in 1995.

Figure 2.1: Kyle-Kyleakin/Skye Bridge: Annual Vehicle Crossings (000)



The opening of the Bridge in 1995 led to an increase in traffic of around 20%. The previous ferry service had provided a crossing of around five minutes, with its operation having been on a 24 hour basis from 1992 onwards. The route was served by two vessels; each with a capacity for up to 36 cars. Tolls were charged on the Bridge which were similar to the fares that had previously been charged for the ferry crossing.

The growth rate slowed in 1996 and 1997, although in 1998 there was a higher rate of increase as the cost of multi-journey books of tickets were reduced. Growth continued until 2003 when 756,000 vehicles crossed the Bridge. This is some 272,000 (56%) greater than in 1994, the last full year of the ferry operation.

The removal of the tolls in late 2004 led to significant growth in each of 2005 and 2006. Traffic volumes in the latter year were over 1.1 million. This is 46% greater than in 2004. It appears that the removal of the tolls has had a greater generative effect than the initial replacement of the ferry service with a tolled fixed link.

Total vehicle trips in 2006 were around 636,000 higher than in 1994. This represents growth of 130% over this period. Therefore, even allowing for underlying traffic growth, induced traffic represents a significant proportion of the total 2006 volumes.

## 2.2.2 Outer Hebrides

### **Introduction**

The following text describes changes in vehicle demand following the introduction of fixed links to three of the islands in the Outer Hebrides. It is based on a range of data from existing reports. Where possible we have updated these with additional and more up-to-date information.

### **Scalpay and Berneray**

A bridge between the island of **Scalpay** and Harris was opened in late 1997. This replaced the previous ferry service which provided sailings throughout the daytime, Monday-Saturday. The ferry conveyed up to 6 cars.

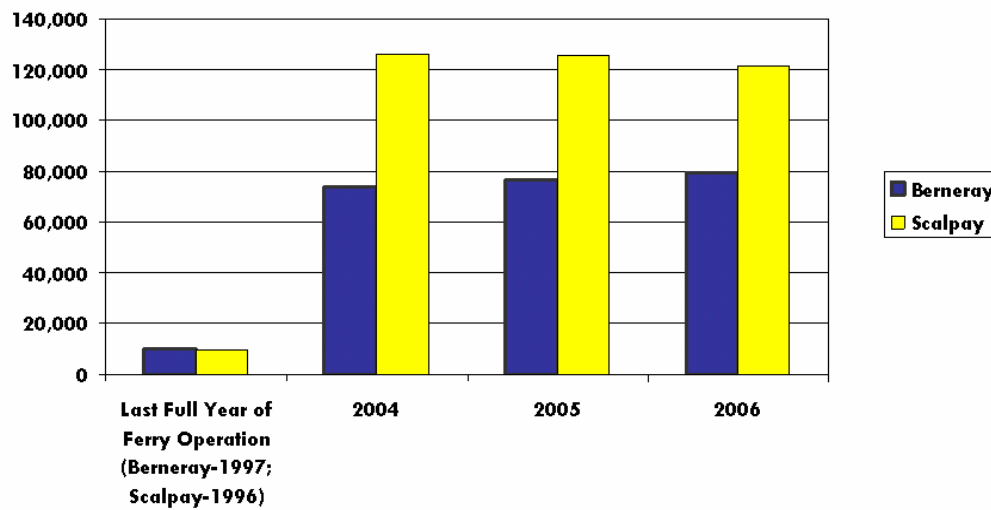
The causeway between **Berneray** and North Uist was opened in late 1998. The previous ferry had capacity for 4 cars and was unable to convey a full-sized commercial vehicle. The service's hours of operation were 0800-2000 in summer and 0800-1800 in winter. Return fares were £0.90 for passengers and £6 for a car, with cheaper fares available through multi-journey tickets.

The fixed link allowed the Sound of Harris ferry service (between Harris and North Uist) to use a port on Berneray. This reduced the crossing time compared with the previous situation where the vessel had to sail directly to/from North Uist. The result is that through traffic between Harris and the Uists travels via Berneray and thus uses the causeway.

**Figure 2.2**, over, compares the car traffic carried on the ferries in their last full year of operation with car volumes on the fixed links for 2004-2006. Cars are the basis of comparison as no ferry data are available which cover all vehicle traffic (ie cars and commercial vehicles).

With Comhairle nan Eilean Siar having installed permanent automatic counters in April 2003, no full year data for traffic using the fixed links are available before 2004. It is, therefore, not possible to comment on the rate of build-up of traffic between the opening of the fixed links and 2004.

Figure 2.2: Berneray Causeway and Scalpay Bridge:  
Growth In Car Traffic



The Figure shows that in both cases, car traffic on the fixed links is significantly above that observed during the ferries' last full year of service. The largest increase is for **Scalpay**. Car traffic to/from the island was round 9,800 in 1996. Following the opening of the Bridge, by 2004 volumes were over 126,000. This is a growth factor of approaching 13, indicating a very large proportionate increase. While traffic has declined slightly in each of the last two years, it is clear that the vast majority of trips made using the Bridge are induced rather than existing trips that were formerly made using the ferry.

**Berneray** has seen lower growth than Scalpay. However, it is still significant in both proportionate and absolute terms. Car traffic has grown from around 10,000 movements in 1994 to over 79,000 in 2006; equal to a growth factor of around 7.7.

The numbers are inflated by the fact that through traffic between Harris and North Uist is included in the volumes using the causeway. This means that the number of trips using the ferry and those using the fixed link are not directly comparable. However, even if all car traffic using the Sound of Harris service is excluded, then trips solely between Berneray and North Uist were, in 2006, around 58,000: that is 5.7 times those observed on the Berneray ferry. Again, the point to note is that induced trips will form a clear majority of total traffic using the causeway.

The SQW evaluation estimated the growth in **passenger** volumes between the ferry service and the fixed links in 2003-2004 as:

- An increase from 24,400 to 200,000 to/from Scalpay.
- An increase from 28,000 to 124,000 to/from Berneray.

The report also shows that around one quarter of these trips are made by residents of the two islands, although there are no baseline data for residents' use of the ferry services against which that figure can be compared.

## Eriskay

The causeway between **Eriskay** and South Uist was completed in 2001. This replaced a vehicular ferry service, which used a vessel similar to that which had served Berneray.

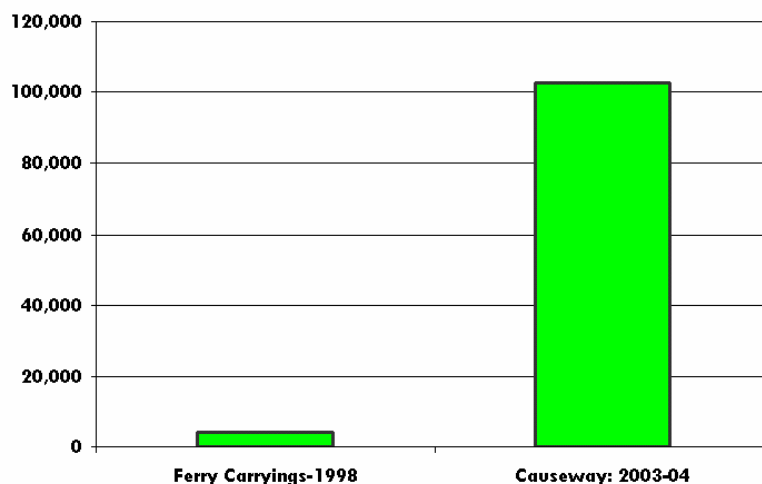
This service operated at a frequency of five return sailings per day, six days per week, in the summer, with a reduction to approximately three return sailings per day in winter. However, the timetable was severely constrained by the state of the tide. Sailings were limited and operated irregularly. There were considerable periods (of approaching 24 hours) when the island had no service. In addition, the sailing patterns limited the amount of time which could be spent either on or off the island, as tidal constraints often prevented an even spread of sailings throughout the day.

The car ferry was supplemented by a passenger vessel, although the latter mainly provided a service between Barra and South Uist; and latterly, a rigid inflatable. However, the passenger-only operations were also subject to tidal constraints.

We have been able to collect only limited data for a comparison of traffic volumes using the former car ferry and that using the causeway. First, the latest ferry data we have been able to source is for 1998. However, given the constraints that the service faced we would not expect ferry traffic to have grown significantly in the years after this. Second, data for the causeway are available only for the period 2003-2004, as traffic counters have not been in place since early 2005.

Using the available data, **Figure 2.3** compares vehicle traffic on the ferry service with that using the causeway.

Figure 2.3: Eriskay Causeway: Growth In Traffic: All Vehicles



It shows a very large increase in the vehicle trips being made-from 3,928 in 1998 up to over 102,000 around 10 years later following the opening of the causeway. As with the fixed link to Berneray, the Eriskay causeway also conveys through traffic. This is for trips between the Uists and Barra which use the Sound of Barra ferry service, the northern terminal for which is sited on Eriskay. Thus the traffic volumes shown at **Figure 2.3** include this through traffic.

However, even if all the Sound of Barra vehicle traffic is excluded, then the volumes on the causeway in 2003-2004 were still approaching 88,000: that is, greatly above the volumes on the former ferry.

### Three Islands Comparison

The fixed link traffic levels shown above for Eriskay are for all vehicle traffic, whereas those for Scalpay and Berneray are for cars only. However, it is possible to compare the **total vehicle traffic** for the fixed links as follows:

- Scalpay: 145,270 (2004).
- Eriskay: 102,609 (2003-04).
- Berneray: 94,535 (2004).

At the time of the 2001 Census, Scalpay had the highest population level. With 322 people this was considerably above the levels on either Berneray (136) or Eriskay (133).

**Table 2.1** shows the number of annual vehicle trips on the fixed links in relation to each island's 2001 population.

<b>TABLE 2.1: OUTER HEBRIDES FIXED LINKS: PROPENSITY TO TRAVEL: ALL VEHICLES: 2004</b>			
<b>Island</b>	<b>Berneray</b>	<b>Eriskay</b>	<b>Scalpay</b>
Total Number of Vehicle Trips	94,535	102,609	145,270
Population	136	133	322
<b>Vehicle Trips Per Capita</b>	<b>695</b>	<b>771</b>	<b>451</b>
Total Number of Vehicle Trips (excluding inter-island ferry traffic)	74,084	87,797	
<b>Vehicle Trips Per Capita (excluding inter-island ferry traffic)</b>	<b>545</b>	<b>660</b>	

Note: Eriskay relate to 2003-04

## 2.3 UPLIFT IN DEMAND: NEW AND ENHANCED FERRY SERVICES

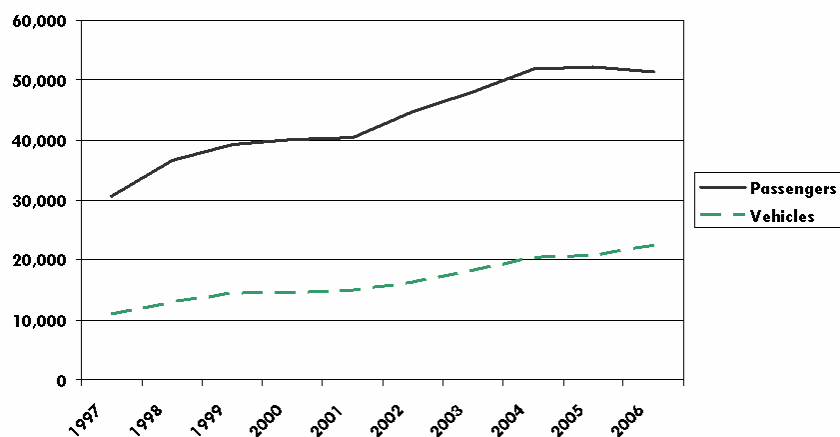
### 2.3.1 Sound of Harris Ferry

A dedicated vehicular service across the Sound of Harris was introduced in 1996. It replaced the previous passenger only service between Harris and the Uists and also the occasional vehicular service operated between Tarbert and Lochmaddy. Relative to the two pre-existing services, the new route offered: lower vehicle fares; greater frequency of sailing; and a shorter crossing time.

**Figure 2.4**, over, shows the growth in traffic on the service since its first full year of operation in 1997. No data are available showing traffic volumes across the Sound prior to the new service. There has clearly been significant growth since 1997. Over the period:

- Passenger traffic has increased from 30,600 to 51,400 (68% growth).
- Vehicle numbers have increased from 10,900 to 22,500 (106% growth).

Figure 2.4: Sound of Harris Ferry Service: Annual Carryings (000)



To cope with increasing demand, a larger vessel was introduced on the route in 2003.

### 2.3.2 Enhanced Ferry Services to Islay

In 2003, the provision of sailings to Islay was significantly enhanced for most (around 19 weeks) of the summer timetable, through the operation of two vessels on the route. The number of return sailings per week increased to 26 compared with 17 offered under the previous timetable. The improved schedule also offered:

- Generally, earlier first sailings and later last sailings.
- Day trips, in both directions of travel, on every day of the week.
- Over eight hours available ashore on most days of the week.

Between 2002 and 2004 in the May-September period (which broadly matches the timeframe over which the additional sailings operated):

- Passenger traffic grew from 72,642 to 87,175 (20% growth).
- Car traffic grew from 22,723 to 26,701 (18%).
- Freight vehicle traffic grew from 2,719 to 3,000 (10%).

The success of the two vessel service has meant that it has now been extended to the full duration of the summer timetable—that is, broadly, April-mid-October.

### 2.3.3 Sound of Barra Ferry

The first full year of operation of the Sound of Barra vehicular service, which links Barra and South Uist, was in 2003. Like the Sound of Harris operation, it replaced a combination of a passenger only service and an occasional vehicular service which formed part of the mainland ferry service between Oban and Castlebay and Lochboisdale.

The new service provided an enhanced vehicular service with lower vehicle fares, a reduced crossing time and greater frequency. The vessel used from 2003 onwards had previously been deployed on the Sound of Harris service. Again, no data are available to allow a comparison of traffic levels across the Sound of Barra prior to the introduction of the dedicated vehicular service.

Traffic growth has been strong in the three years to 2006, as follows, approximately:

- Passengers: from 27,000 to 37,000 (37% increase).
- Cars: from 10,000 to 13,000 (32%).
- Coaches: from 50 to 151 (202%).
- Freight vehicles: from 500 to 1,300 (156%).

## 2.4 ECONOMIC AND SOCIAL IMPACTS: FIXED LINKS: SKYE BRIDGE

### 2.4.1 Introduction

The DHC report assessed the impacts of the Skye Bridge in terms of:

- Transport & Economic Efficiency (TEE).
- Some types of Economic Activity and Location Impacts (EALI).
- Some issues around Accessibility.
- Other impacts.

The main findings are summarised in this section.

The DHC study also commented on its implications for future appraisal. The relevant issues are discussed at **Chapter 3**.

### 2.4.2 TEE

#### **User Benefits**

The report states that following the introduction of the bridge and the subsequent removal of the tolls, "transport changes have been significant, affecting the time, cost, comfort, convenience, reliability, and image of travelling to Skye".

However, the study also recognised that not all of these factors could be quantified within the TEE analysis. It notes, for example, that there are no WebTag values for reliability and comfort, although some user benefits associated with improvements in these attributes would be expected. For example, improved reliability from a fixed link would include elimination of previous ferry reliability problems, although it is also the case that the bridge closes on occasion when there are high winds.

The DHC work states that between its opening in 1995 and the end of 2006, the user benefits from the bridge have been nearly £100 million. **Table 2.2**, over, shows the DHC estimates for the net user benefits (ie after netting off disbenefits to pedestrians) for the year 2006. This is for the toll-free bridge compared with the previous ferry service.

<b>TABLE 2.2: SKYE BRIDGE SINGLE YEAR (2006) NET USER BENEFITS</b>	
<b>Element</b>	<b>Net Benefit (£000)</b>
Fare Savings	6,067
Time Savings	4,688
Inconvenience Costs	1,541
Vehicle Operating Costs	(80)
<b>Total</b>	<b>12,216</b>

Note: Data are in 2006 values and prices

It shows total net benefits of around £12.2 million. Of these, 50% are attributable to Fare Savings, with a further 38% from Time Savings.

A further 13% (around £1.5 million) is attributable to "**Inconvenience Costs**". These are not usually included in TEE analysis. The DHC report defines them as the willingness of users to pay for a fixed link relative to a ferry in order to alleviate travel constraints (fixed departure times and hours of operation) and reduce uncertainty associated with ferry service. Inconvenience costs are additional to the travel time costs and out of pocket costs included in an economic appraisal.

In this case, given that the pre-existing ferry service had been a 24 hour operation, DHC based the value for the inconvenience cost on those for public transport headways shown in the *Passenger Demand Forecasting Handbook*.

### **Other Possible Benefits**

In addition to inconvenience costs, DHC considered that businesses and households may attach a value to a fixed link over a ferry; one that is not related to their use of the link-ie some form of **non-use value**. However, the study concluded that no robust data were available from pre-existing research to allow quantification of such a non-use value. Therefore this was not included in the TEE, although DHC state that if such a value could be derived it would be additional to the user benefits (which are shown at **Table 2.2**).

In contrast, the study found little evidence of **agglomeration** impacts from the bridge. These would arise, it is stated, from "improved proximity to other businesses, employees and customers (which) can bring about productivity gains that exceed the pure efficiency saving in the transport costs". Values for agglomeration have been developed through research for DfT and are now beginning to be included in TEE analysis for major transport projects.

The lack of agglomeration effects are attributed to:

- The sectoral composition of areas such as Skye & Lochalsh, where there is a relatively strong representation of primary activities. The implication is that agglomeration is less significant for these sectors than for manufacturing and some service sectors.
- Lack of critical mass, given the scale of the local economy.
- Possibly, but apparently less likely, the limited elapsed time between removal of the tolls (2004) and undertaking the research (2006).

It is also stated that these findings are supported by evidence from Norway.

## Results

The main point regarding the scale of user benefits is that DHC estimate that, even assuming future low traffic growth, the benefits over a 60 year period are likely to be over £400 million. This compares to a construction cost of under £100 million. (Both figures are discounted and in 2006 values and prices).

DHC state that the cost benefit analysis undertaken as part of the original appraisal of the bridge "significantly underestimated" the economic benefits. This appears to be because the amount of induced travel has been well above that forecast. Even whilst the tolls were in place, the traffic growth was higher than even the high growth predictions. DHC concluded that even if the toll had not been removed the economic benefits would remain "substantially underestimated, by a factor of at least two".

### 2.4.3 EAL

The study assessed a range of impacts. These were not, however, in the structured form set out in STAG. Nor was there any quantification of impacts on employment and GDP (through for example, increased tourism activity). The main impacts identified were as follows:

#### 1

Both positive and negative changes in local markets. This has increased in significance since the tolls were removed. Some businesses appear to be becoming more successful in response to the opportunities for larger markets, while others have seen decline in response to increased competition. In addition, some specific instances are given where new markets have been developed as a result of the tolls. For example, Forest Enterprise indicated that removing the tolls saved them a sufficient amount to enable the export of low quality wood.

#### 2

Removal of the tolls, in particular, has led to stronger links between Lochalsh and south Skye. This is not only in terms of companies' markets (notably retail) but also greater integration of the two areas labour markets, increasing the scope for business growth. Increasing the labour catchment for businesses is important given the seasonal, part-time and lower paid nature of a significant proportion of the areas' employment bases.

#### 3

Local households have saved £0.4-£0.8million annually through the removal of the tolls. However, a proportion of this saving has been reinvested (in vehicle operating costs) in making additional trips. Around half the saving has been spent in this way, with the other half available for spending in other sectors of the local economy.

#### 4

The impact of the toll removal appears to have had less impact on tourism than on local people. However, it appears to be encouraging growth in the more cost sensitive parts of the visitor market, such as campsites. The report also states that, overall, Skye is perceived by most tourists as being a better place to visit as a result of the bridge.

#### 5

With public agencies (such as health and social services) accounting for over a third of business travel in the area the wider public sector benefits are significant through staff travel alone. The study estimates that the total savings to public sector budgets have been over £25,000 from the abolition of the tolls. However, these savings have been absorbed by wider service budgets: that is, spent on other aspects of service delivery.

#### 6

Over 40% of businesses that undertook "other business travel" (ie excluding goods deliveries), indicated that they had increased their frequency of travel over the bridge since the removal of the tolls. One Skye-based consultee commented that:

*"Before the removal of the tolls I would have gone to Kyle with a few things to do, but now cross the bridge to Kyle if I only need one thing"*

Thus certain business trips and activities have been brought forward in time as a result of the toll-free bridge.

#### 2.4.4 Accessibility

The DHC report notes that for local residents "by far the largest group of trips" across the bridge are for shopping, health, education, and personal business. Travel to work and employer's business trips account for a relatively low number of trips. It is, however, quite possible that this profile is typical of traffic in rural Scotland. In addition, following the removal of the tolls, it might be expected that increases in employer's business and commuting trips will take longer to emerge than those made for leisure purposes.

#### 2.4.5 Other Impacts

Other impacts covered by the DHC work include, first, potential **population impacts**. The DHC work notes that Skye has been successful in attracting population but that the extent to which this can be attributed to the bridge and the removal of the tolls is "not clear".

However, the surveys undertaken during the research show that, of those reporting an impact of the removal of tolls, 8% stated that this had led them to move, or to consider moving, to the island. Further, the ITS study referred to the 1999 Skye Bridge evaluation's finding that 6% of island residents surveyed indicated that they had moved to Skye from elsewhere because of the bridge.

Second, the removal of the tolls has changed perceptions of the Skye Bridge, so that it is now, "almost universally, perceived positively by local residents and businesses" The report states that this has the benefit of "helping to underpin **business confidence** and making the area **a better place to live and visit**".

Finally, local communities have retained their **island identity**. Although there are concerns about increased criminal activity as a result of easy access to the mainland, there has been **no significant change in crime levels**. These are important points because they relate to two concerns often expressed by some members of communities where fixed links are being proposed.

## 2.5 **ECONOMIC AND SOCIAL IMPACTS: FIXED LINKS: BERNERAY AND SCALPAY**

### 2.5.1 Introduction

The SQW work evaluated the economic and social impacts of the fixed links to Berneray and Scalpay. This was in 2003; a number of years after the links had been opened. The study assessed the impacts through an analysis of: secondary data; and primary research with island residents and businesses.

### 2.5.2 Secondary Data Analysis

Changes in a number of indicators were assessed by comparing the results of the 1991 and 2001 Censuses. The fixed links could have had some effect on the relevant indicators, albeit that they were opened towards the end of the 1990s and thus did not exist for the whole inter-Census period. The SQW research found that:

**Population.** Although the population on Scalpay has continued to fall (by 25% and 133 people since 1981) the rate of decline was slightly slower between 1991 and 2001. On Berneray, despite a modest increase between 1981 and 1991, population fell again slightly in the ten years to 2001, but the rate of decline was significantly lower than on other islands.

**Population Structure.** Between 1991 and 2001, the percentage of under 16s fell in Berneray but increased slightly on Scalpay. The average age of the population continued to rise on both islands.

**Households.** The number of households on both Berneray and Scalpay remained broadly constant, compared to a fall across all inhabited islands.

**School Rolls.** The primary school roll on Scalpay has fallen steadily since 1976 when there were 55 pupils. In 2003, there were 23 but, the report notes, the rate of decline appears to have slowed in the last few years. (The most recent data show that the school roll in 2006/07 had increased to 27).

**Migration.** The Census data show that between 2000 and 2001 there was a net in-migration of four people to both islands. This may appear to be a small number. However, it should be viewed against the net out-migration of all inhabited islands.

**Employment.** The proportion of the population in employment on both islands increased between 1991 and 2001. On Berneray there was an increase in the employment rate for women from 50% to 76%. The report notes that this could be due to improved access to employment off the island as a result of the causeway.

**Daytime location.** This shows the proportion of the island's residents travelling off the island for work or study. For both islands the proportion is relatively high compared with other inhabited islands, although there is no comparison with 1991. In the case of Berneray, almost a quarter of all residents are off the island in the daytime, which the report notes "supports the sharp increase in levels of employment and is likely to be a result of the opening of the causeway".

It is important to place the data for Berneray and Scalpay in the context of the Outer Hebrides. During the period between 1991 and 2001, the islands as a whole faced: sharply declining population, including significant outmigration; an increasingly imbalanced demographic profile; declining school rolls; and limited employment opportunities.

### 2.5.3 Primary Research Findings

#### Economic Impacts

The primary research findings are summarised at **Table 2.3**.

<b>TABLE 2.3: BERNERAY AND SCALPAY FIXED LINKS: SUMMARY OF ATTRIBUTABLE ECONOMIC IMPACTS</b>		
	<b>Berneray</b>	<b>Scalpay</b>
<b>Increase In Annual Turnover (All Businesses)</b>		
Turnover	£30,000	£66,000*
<b>Annual Cost Savings (All Businesses)</b>		
Cost Savings	£39,000	£9,000
<b>Tourism</b>		
Annual Visitor Trips	10,700	11,100
Annual Visitor Expenditure	£65,000	£74,000
Number of New B&B Businesses	2	6
<b>Annual Public Sector Savings</b>		
Annual Savings	£40,000	
<b>Annual Net Financial Gain Per Household</b>		
Net Gain	£407	£828

\* Note: Excludes one major employer which has now ceased trading

Some of these impacts may appear modest. However, they need to be understood in the context of the low level of population on each of Scalpay (322 people) and Berneray (136).

Increased visitor spend will, to an extent, be offset by induced off-island trips where residents spend money in shops and other services elsewhere in the Outer Hebrides. However, the net financial gain per household includes the positive aspects in terms of access to cheaper goods and services, as well as income from improved access to employment outside the island where they live.

The SQW study concluded that across the combined categories of household savings, business cost savings, changes in business turnover-including leakage of expenditure, and public sector savings, the total annual financial benefit from the fixed links was as follows:

- Scalpay: £200,000.
- Berneray: £82,000.

### **Population and Quality Of Life**

Household survey evidence indicates that the fixed links have contributed to population retention on both islands. In 20% of households on Scalpay and 7% on Berneray, the interviewee stated that they or other members of the household would have moved from the island had the fixed links not been established. In terms of quality of life, 97% of Scalpay residents stated that the fixed link had been very important or important to their quality of life. The comparable figure for Berneray residents was 90%.

The study's wider consultations highlighted a range of impacts which had contributed to improved quality of life, including:

- Better delivery of social care including respite for carers and day care.
- Berneray secondary schoolchildren no longer had to live in an off-island hostel during the week and were therefore able to return home each evening.
- Improved access to training and educational opportunities elsewhere in the Outer Hebrides.

It can be expected that these factors will make the two islands more attractive places to live and thus aid the retention and attraction of population. This point is also made in the ITS review of a range of Highlands & Islands transport projects. It states that:

*"New transport infrastructure and services can, through improvements to quality of life, affect migration and potentially help stabilise declining populations-or at least reduce the rate of decline"*

The SQW study concludes on this issue by stating that assessing the costs and benefits of the fixed links is not straightforward and that, to an extent, "hinges on how population levels and quality of life should be measured and monetarised".

## **2.6 ECONOMIC AND SOCIAL IMPACTS: NEW AND ENHANCED FERRY SERVICES**

### **2.6.1 Sound of Harris**

#### **Economic Impacts**

The evaluation found that the Sound of Harris service in 2003:

- Provided annual savings of £500,000 for companies in the Western Isles and a further £150,000 for companies based on mainland Scotland.

- Generated £1.5 million of net additional visitor expenditure with an associated 44 FTE jobs within the Outer Hebrides. 32% of visitors said they would not have travelled to the islands if the Sound of Harris Ferry Service had not been available.
- Was well used by residents who accounted for 38% of passenger trips and 50% of car trips.

The report concluded more widely that the general competitiveness of the Outer Hebrides has been enhanced through the introduction of the ferry service. This is through reducing the costs of accessing markets.

### **Accessibility and Social Inclusion**

The evaluation also showed positive results regarding accessibility, social inclusion and quality of life for residents:

- 34% of residents use the ferry to access services-notably the local authority's offices, training and education providers and healthcare.
- 42% of residents use the ferry to access a range of social activities, including sports, cultural activities and VFR.
- The vast majority (89%) believed that the ferry service had allowed them better access to, and more social integration with, other parts of the Outer Hebrides. Prior to the introduction of the new route, one in three residents passengers had not travelled between the two parts of the Outer Hebrides connected by the Sound of Harris route.
- In addition, 66% believed that the ferry service had reduced the extent of isolation felt by residents.

#### **2.6.2 Enhanced Ferry Services to Islay**

The 2006 evaluation identified a range of economic impacts from the additional summer sailings to Islay. Many of these could not be quantified. The exception was the impact on visitor activity which, it was estimated, had in 2004 generated an additional 5,400 visitors to Islay & Jura with an associated increase in expenditure of £1.345 million.

The survey of island businesses, which encompassed a range of sectors, found that:

- Over half (57%) of the companies stated that the extra sailings had a “very positive” impact on their business, with a further 30% citing a “positive” impact. The main sources of impact were increased numbers of customers and efficiency gains in serving mainland-based customers and receiving goods inwards.
- Approaching two-thirds (65%) of respondents stated that there had been a positive impact on their business turnover from the additional sailings.

- Just over half (54%) of those considering capital investment/business expansion in the next year had had their plans influenced by the operation of the extra sailings.
- The vast majority (89%) of respondents stated that the scale of impacts was due to increased frequency of sailing/timings of additional sailings, rather than the provision of additional capacity per se. The view was expressed that impacts would have been much less if greater capacity had been offered by operating one large vessel based on the former timetable.

For the road haulage sector, the extended summer timetable was seen as offering the following benefits:

- The later sailings from Islay allow more time to pick up or consolidate outbound loads.
- A greater range of sailing times offers more operational flexibility.
- Later evening arrivals on Islay provide the opportunity to begin deliveries to customers at the start of the following working day.

The report also noted that even where island businesses' and residents' trip frequency is unchanged they will still have benefited from being able to travel at times more suited to their trip purpose.

## 2.7 CONCLUSIONS

We conclude that both fixed links and enhanced ferry services can generate significant traffic volumes and economic benefits. In some cases, the level of induced traffic is significantly above existing flows. It appears that there are difficulties in accurately forecasting uplift in demand in remote areas where: existing transport provision is quite limited: and some projects, such as fixed links, can represent quite radical interventions.

From our own knowledge and the evidence for the Skye Bridge, the level of induced traffic in a number of the projects reviewed in this Chapter is significantly higher than had been forecast. Accordingly, the original appraisals will have understated the level of economic benefits actually achieved.

### 3 **ISSUES FOR APPRAISAL**

#### 3.1 **INTRODUCTION**

**Chapter 2** has shown that transport investment in the remote parts of the Highlands & Islands has the capacity to generate significant increases in demand and equally significant economic and social impacts. The analysis was based on a number of ex post evaluation studies supplemented by updated traffic flow data.

This Chapter reviews a number of issues for **appraisal** arising from the analysis presented at **Chapter 2**. It discusses the following six issues:

- Comparing short term capital and long-term revenue projects.
- Forecasting the level of induced traffic.
- The economic value of induced trips.
- Appraising other impacts.
- Inconvenience, reliability and comfort factors
- Option values.

#### 3.2 **COMPARING SHORT TERM CAPITAL AND LONG TERM REVENUE PROJECTS**

STAG follows Treasury Green Book and DfT's WebTag guidance in that all costs are discounted and general price inflation is normally excluded. We understand the basis ("social time preference") for this approach. However, it appears to automatically favour revenue-based solutions, as costs incurred beyond first 10-15 years have relatively little impact, despite the fact that this will be an on-going spend commitment to government. This is, arguably, an issue that could be covered under "implementability" during STAG Part 1.

It appears that no account is taken of the last of these factors. Revenue-based projects could incur greater total actual financial costs (including those associated with general price inflation) over the appraisal period than an upfront capital project. Related to this is the uncertainty over actual costs of operating ferry services over, say, a 60 year period given possible variations in fuel prices and the possible introduction of additional maritime safety legislation. Despite this, there does not appear to be the use of optimism bias in the forecasting of revenue costs which are, in effect, assumed to be much more predictable than capital costs.

Finally, the nature of the infrastructure concerned (fixed links and also ferry terminals) is such that there is only a certain degree of relationship between the infrastructure cost and the volume of demand for it. Thus there is a minimum level of investment that is necessarily required for, say, a causeway irrespective of the traffic levels it will accommodate.

Each of these factors was particularly apparent in the 2007 appraisal of the possible introduction of a fixed link across Cuan Sound to replace the ferry service to the island of Luing. In particular, where sensitivity tests were undertaken to examine a higher level of ferry operating costs, the performance of the fixed link compared with a continued ferry service improved quite markedly.

The Cuan appraisal report argued that the discounting process and the non-inclusion of general price inflation meant there were difficulties in appraising a fixed link against the continued provision of a ferry service. This is because:

*"STAG is normally used to compare two or more broadly similar capital schemes, not a capital scheme against a revenue scheme as is the case in this instance. Here we are comparing the one-off capital cost of a bridge with the long term funding commitment of a ferry service"*

And for these reasons the study concluded that:

*"The STAG 2 appraisal does not seem to be ideally suited to the comparison of capital and revenue projects"*

### 3.3 FORECASTING THE LEVEL OF INDUCED TRAFFIC

**Chapter 2** showed very significant levels of traffic generation from a range of fixed links and new/enhanced ferry services. In most cases actual traffic levels have exceeded the forecast levels by a large amount. However, to those used to appraising transport projects elsewhere in Scotland, projected traffic growth rates of, say, over 200%, may appear unrealistic.

The projects' nature means that demand forecasting is not easy or straightforward. However, unlike other modes in the more populous parts of Scotland there are few data to allow an agreed approach to traffic projections, particularly for the unconstrained access that fixed links can provide. On this basis, there is a clear role for the evaluation evidence shown at **Chapter 2** to inform and support traffic forecasts for fixed links.

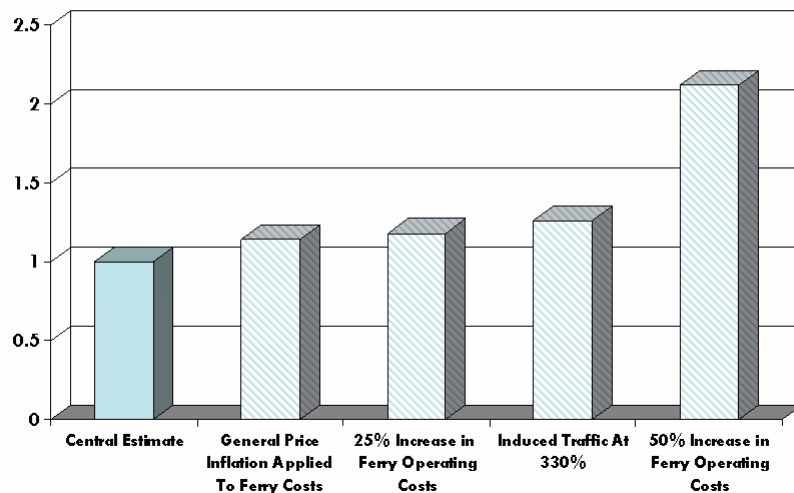
In part, the underestimation of demand may be related to the focus of TEE analysis on the traditional elements of time and cost savings. For certain projects, the savings per user may appear relatively modest. However, they do not take into account elements such as inconvenience costs which may, in fact, lead to a conclusion that demand is being highly constrained by infrequent ferry services with limited operating hours.

These points are key because, as seen at **Chapter 2**, induced traffic levels are, in a number of instances, considerably greater than the pre-existing traffic levels. Failure to properly measure induced traffic therefore runs the risk that the NPV and BCR are underestimated; and/or in the case of ferry services that insufficient capacity is provided on a route and that a further new vessel has to be acquired in a short period of time.

The Cuan Sound fixed link appraisal included a central estimate of 200% induced traffic levels. This was based in part on the induced impacts observed in the three recent fixed links in the Outer Hebrides, as stated intention surveys undertaken for the Cuan study appeared to significantly underestimate the likely level of traffic growth. Given the uncertainty, a sensitivity test was undertaken which assumed 330% induced traffic. This improved the relative performance of the fixed link although, in part because of the rule of a half, this was to a lesser extent than the sensitivity test applied to the operating costs (discussed at **3.2**).

**Figure 3.1** shows the outcomes from the various sensitivity tests conducted as part of the Cuan Sound appraisal. The BCR figures are relative to a Do Minimum scenario that encompasses replacement of the existing vessels and the continuation of the present timetable.

Figure 3.1: Cuan Sound Appraisal: BCR of Fixed Link Compared to Do Minimum: Sensitivity Tests



### 3.4 THE ECONOMIC VALUE OF INDUCED TRIPS

Transport appraisal values the benefits of time, cost and other savings of induced trips at half the value attributed to those accruing to existing trips. Again, we understand the theory underlying this approach, which is conventionally termed the "rule of a half". However, it raises a number of issues, as follows:

#### 1

It is in contrast to the value placed on induced trips in the wider economy and the implied 'additional' activity supported by economic development agencies such as HIE. In the case of the EALI analysis for Scalpay and Berneray, the economic benefits are solely from the additional trips made to/from the islands due to the introduction of the fixed links.

It could be argued that these are taken into account in the balanced STAG approach which covers both TEE and EALI. However, the rule of a half means that the BCR could be at a level which is considered not to offer value for money, irrespective of the EALI findings. Again, this is in a context where **induced traffic may account for the majority of the projected traffic** for a fixed link. Thus a project's apparent value for money (at least on the TEE measure) can be highly sensitive to the level of benefit assigned to induced trips.

#### 2

WebTag guidance sets out the circumstances in which it is appropriate to apply the rule of a half. For some projects, these circumstances may not apply for the following reasons.

First, WebTag notes that the rule applies where there are "relatively small changes in (user) costs". This may not apply in the case of fixed links or enhanced ferry services, where existing transport provision is limited, especially if factors such as inconvenience costs are included in the appraisal. WebTag states that the rule of a half breaks down where there is large generalised cost changes-for example, as a result of a new estuarial crossing.

Second, the guidance states that the rule of a half also breaks down where there is the introduction of new modes. This appears to be the case where a ferry crossing is replaced with a fixed link.

Third, the WebTag guidance notes that the rule of a half is based, in part, on the assumption "that the main substitutes and complements for travel from A to B are travel from A to other destinations, by other modes, using other routes and so on." This will not apply in the case of the fixed links in the Outer Hebrides. Given their island location, residents' induced trips will represent an increase in **total** trip-making rather than replacing other trips. Thus the induced trips will be made at the expense (in terms of time and cost) of **other** types of activities (eg gardening). This raises issues around the applicability of the rule of a half of induced trips made by island residents after the fixed links were opened.

### 3

There are a number of other issues in relation to the value that travellers attach to induced trips:

- As shown at **2.4.2**, where trip-making is constrained in some way, then individuals tend to save up a number of tasks (eg visit the bank, visit suppliers) to complete in one trip whereas they would otherwise undertake these in a number of individual trips were the generalised costs of travel reduced. Therefore, these additional trips **bring forward activities in time** which must be of benefit to both business and leisure trips.
- **Chapter 2** showed a *rebound effect* on Skye where a considerable proportion of the toll savings were re-invested in making additional trips. This again implies a certain value to these new trips. It could be argued that if these trips were not being made previously then they are of less value than those that were being made when the tolls were in place. However, where, for example, a ferry timetable prevents daily commuting to work from an island, and this constraint is removed and commuting becomes possible, new trips are being made to which considerable value is attached which were simply **not possible** to make before.

### 3.5 APPRAISING OTHER IMPACTS (EALI AND ACCESSIBILITY)

EALI and social/accessibility benefits are included within STAG. For the former, these encompass a range of impacts including:

- Labour market impacts. These, however, tend to be analysed under social inclusion rather than the economic benefits they can offer by increasing firm's competitiveness, as was shown to be emerging in the case of the Skye Bridge.

- Effects on competition. These tend to be seen very much in terms of the *two way road* argument, with the perceived risk that local companies lose custom and employment to competition from outside the area as markets are expanded geographically. However as the Berneray/Scalpay evaluations showed there are benefits to consumers and businesses through increased choice and lower prices.

In addition, many transport projects in the more remote parts of the Highlands & Islands have a strong underlying objective of economic development. This reflects the relatively low GDP levels in these areas. It is also evident in documents such as the HITRANS draft Regional Transport Strategy.

Related to this, both the DHC work and the 2004 ITS study emphasise the need for appraisal to be clearly against local/regional objectives including economic development and also population growth, as well as STAG's five national objectives.

While there is scope for this in STAG as it stands, this point requires, perhaps, to be given more emphasis in the guidance. As the DHC study comments:

*"The extent to which transport changes support the economic and social strengths of the area is crucial. The starting point in STAG appraisals is rightly to define local objectives related to these factors but the Skye Bridge emphasises the particular importance of these local objectives in remote areas"*

**In particular**, there is scope for the national level "Economic" Objective to more explicitly reflect balanced regional development across Scotland, population growth and other issues which are contained in documents such as *Framework for Economic Development in Scotland* (and *Smart Successful Scotland*). That is, there needs to be more explicit links made between the types of economic impacts considered under STAG's Economic objective and the development of national economic policy since STAG was first published in 2003.

This would help somewhat to bridge the gap between transport appraisal and the appraisal procedures of organisations such as HIE which generally use neither BCRs nor NPVs to assess the economic impacts of their investments including those which relate to transport. Rather, the emphasis is on economic and social impacts and contribution to strategic objectives including population growth and sustainable communities through, *inter alia*, access to services and leisure and cultural facilities.

There also needs to be confidence that EALI and Accessibility impacts, elements of which remain difficult to quantify, are given sufficient weight when projects with relatively low BCRs are being considered for funding. To support this, there should also be a greater emphasis in the guidance on a structured approach to EALIs, and attempts to at least scale impacts where these cannot be monetised. It may require emphasising that the Part 2 ASTs should contain structured summaries of a much more extensive EALI analysis.

## 3.6 TEE ANALYSIS: INCONVENIENCE, RELIABILITY AND COMFORT FACTORS

### 3.6.1 Reliability and Comfort

As discussed at **Chapter 2**, the evaluation of the Skye Bridge stated that "transport changes have been significant, affecting the time, cost, comfort, convenience, reliability, and image of travelling to Skye". However, it was also noted that it was not possible to include the comfort, reliability and image impacts within the assessment as no standard values are available for use.

This raises a similar issue for appraisal of fixed link projects and means that, in effect, the quantified TEE assessment will understate the full range of user benefits, as the comfort and reliability factors can only be included in qualitative form. The DHC report states, however, that: "transport investment appraisal needs to include issues such as convenience, comfort, reliability and image in addition to cost and time".

### 3.6.2 Inconvenience Costs

As shown at **Chapter 2**, the Skye Bridge evaluation did include a value for reduced inconvenience costs. It was assumed that these were removed after the bridge opened as access was no longer constrained by a fixed ferry timetable. The DHC report states that the concept has been used in fixed link appraisals in Norway, although not in other Scandinavian countries. As the inconvenience benefits are related to not needing to wait for a ferry they are additional to any journey time savings arising from the fixed link.

The values used in Norway are based on ex post evaluation studies. It appears that these may understate those that could apply in Scotland. This is because Norwegian ferry services tend to have greater frequency and longer hours of operation than comparable ones in Scotland (although the former Kyle-Kyleakin service was exceptional in this regard).

The ex post research found that inconvenience costs can increase the economic benefits of a fixed link by up to 60%, where they replace relatively infrequent ferry services. However, the impacts were quite scheme dependent and in some cases the increase in user benefits was much lower than this (ie under 20%). The higher values are associated with situations in which ferry times are restrictive and/or there are many opportunities for socialising, working or business activity on either side of the crossing.

The DHC work translated the Norwegian inconvenience cost values into values (ie time savings expressed in £) that relate to TEE inputs in Scottish appraisals. The values are shown at **Table 3.1**, over.

It is our understanding, however, that inconvenience costs have generally not been included in appraisals within Scotland. The ITS study notes that a possible exception to this is a 2004 appraisal of the proposed HITRANS air service network.

<b>TABLE 3.1: NORWEGIAN INCONVENIENCE COSTS OF FERRIES COMPARED TO FIXED LINKS</b>		
<b>Ferry Service Type</b>	<b>Inconvenience Cost (£)</b>	
	<b>Car</b>	<b>HGV</b>
Ferry to town/city centre	0.33-0.96	2.65
Other ferry links	1.05-3.03	3.18
High dependency/low frequency ferry links	1.57-4.54	4.77

Note: Values are expressed in 2002 prices. Ranges for car-based trips reflect the difference between non-work trips and work trips

In the case of the Cuan Sound appraisal, user and household surveys identified the vehicles ferry service's main constraint as being its **limited hours of operation**, rather than fares, reliability, service frequency or vessel capacity. This implies that removing the inconvenience costs arising from limited hours of ferry operation, through a fixed link, could have a greater impact, in terms of user benefits, than time or financial cost savings. However, no allowance for inconvenience costs was made in the Cuan Sound appraisal.

The DHC report concluded that:

*"Inconvenience costs are quite substantial elements of the benefit of fixed links and should be included in an appraisal of the links"*

This is supported by the report's reference to ongoing ex post evaluations of fixed links in the Outer Hebrides which have found that the "inconvenience costs of short ferry operating hours is substantial". The clear implication is that inconvenience costs should generally be included in appraisals of proposals to increase the operating hours of ferry services.

### 3.7 TEE ANALYSIS: OPTION VALUES

The ITS study defines option values as the:

*"the value which people and businesses place on the assurance that a particular asset will continue to exist in the future...it is like an insurance premium or a waiver fee in return for the assurance that the particular asset will continue to be available"*

This is a non-use value: that is, it is the value that individuals attach to an asset (eg a fixed link, or a ferry service) apart from that derived from any actual use they may make of it.

According to the ITS work, there has been little use, to date, of quantified option values in transport appraisal in Scotland. This, in part, appears to reflect a lack of underlying research which has tended to be restricted to rail.

The ITS report argues that option values are likely to be substantial when the connection to a location is a 'lifeline service' with which the individual or business thinks there is a considerable risk. Realistically it is unlikely that the risk would involve complete cessation of a ferry service where this is the sole link to an island. Rather it may relate to the possible reduction in the frequency or operating hours of the ferry. In contrast, a fixed link is 'always there' and 'they can't take it away'.

The Cuan Sound appraisal identified concerns regarding the "availability of long term funding to maintain the existing ferry timetable". However, no option values were included in the TEE analysis.

The ITS study states that they would expect option values to be "significant elements of total economic value" for the following types of projects in the Highlands & Islands:

- Replacing a ferry link with a fixed link, particularly to/from a small island community with limited services.
- Increasing the frequency of a very low frequency public transport service (ferry or air).

The study concludes that:

*"in the context of sparse networks of limited capacity and frequency, the value for travellers of an assured facility (option value), reduced schedule delay and improved reliability are of greater significance relative to the standard elements of time and costs"*

Thus the inclusion of these factors in the appraisal of many fixed links and ferry service enhancement projects could significantly increase the total user benefits.

**APPENDIX: BIBLIOGRAPHY**

- Atkins: *Cuan Sound Transport Links STAG Appraisal: Draft Final Report* (2007)
- DHC: *Evaluation of the Economic and Social Impacts of the Skye Bridge* (2007)
- Grangeston Economics: *Evaluation of the Social & Economic Impacts of The Sound of Harris Ferry Service* (2003)
- Institute of Transport Studies, University of Leeds: *Option Values, Business And Population Impacts In Transport Assessment: Scoping Study* (2004)
- Reference Economic Consultants: *Economic Impacts of Increased Summer Sailing Frequency on Ferry Services To Islay* (2006)
- SQW: *Evaluation Of The Social & Economic Impacts Of Fixed Links To The Islands Of Scalpay And Berneray* (2004)