HITRANS

Investment in Lifeline Rural Roads
Individual Scheme Appraisals – Salen to Kilchoan
September 2004

Halcrow Group Limited

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Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Signed

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1 Introduction (Salen to Kilchoan)

1.1 ***Background***

1.1.1 HITRANS, the Highlands and Islands Strategic Transport Partnership, commissioned Halcrow Group Ltd to undertake a study to support the campaign for further investment in lifeline rural roads.

1.1.2 The study was split into two stages. Stage One undertook an extensive consultation process to evaluate the issues surrounding lifeline roads including key problems and constraints facing rural communities. The aim of the second stage was to carry out an economic appraisal of nine designated routes in order to bolster the findings of the initial research such as to make an economic case for sustainable increases in investment in lifeline roads.

1.1.3 This report represents part of the second stage of the project. It presents, in full, the economic assessment carried out on the proposed Salen to Kilchoan road improvement scheme. It does not seek to encompass all the wider issues involved within the study and does not present the methodology. As such it should be read in conjunction with the main 'Investment in Lifeline Rural Roads: Stage Two Final Report'[1].

1.2 ***Report Structure***

1.2.1 **Section 2** presents the contextual background to the scheme. It also assesses the existing road conditions and the proposed scheme enhancements;

1.2.2 **Section 3** presents an assessment of the likely impacts of the scheme;

1.2.3 **Section 4** presents the Transport Economic Efficiently (TEE) analysis;

1.2.4 **Section 5** summaries previous work undertaken to analyse the economic and social impact of the proposed scheme; and

1.2.5 **Section 6**presents the conclusions.

[1] Halcrow (2004)

2 Background (Salen to Kilchoan)

2.1 ***Contextual Background***

2.1.1 The B8007 provides the sole access into the Ardnamurchan region. It provides a link from the A861 at Salen through to the port at Kilchoan. From Kilchoan ferries run across to Tobermory on Mull. Figure 1 presents a map of the route.

2.1.2 The route is entirely single-track and of a poor standard leading to a constant requirement to maintain the basic road structure. The poor accessibility of the area is highlighted as a key restriction to the economic prosperity of the region.

2.1.3 Public transport operations have become increasingly important in recent times due to, in particular, an increased demand for school transportation within the region. The condition of the current road provision is not of a sufficient standard to allow efficient operation of PSVs.

2.2 ***Local Economy***

2.2.1 The Scottish Census Results On-Line (SCROL) data (2003) presented in Section 4.4 indicates that Ardnamurchan has a population of around 300 permanent residents. Salen is estimated to have just over 100 residents, whilst Kilchoan has nearly 150.

2.2.2 Employment levels across Ardnamurchan are estimated at just over 150, although some of these are likely to be part-time or seasonal jobs. The majority of the jobs in the tertiary sector.

2.2.3 Unemployment levels within Ardnamurchan are estimated at 5.6%. This compares to the rate for the Scotland as a whole of just under 4%, indicating that the area suffers from much lower than average opportunities for employment.

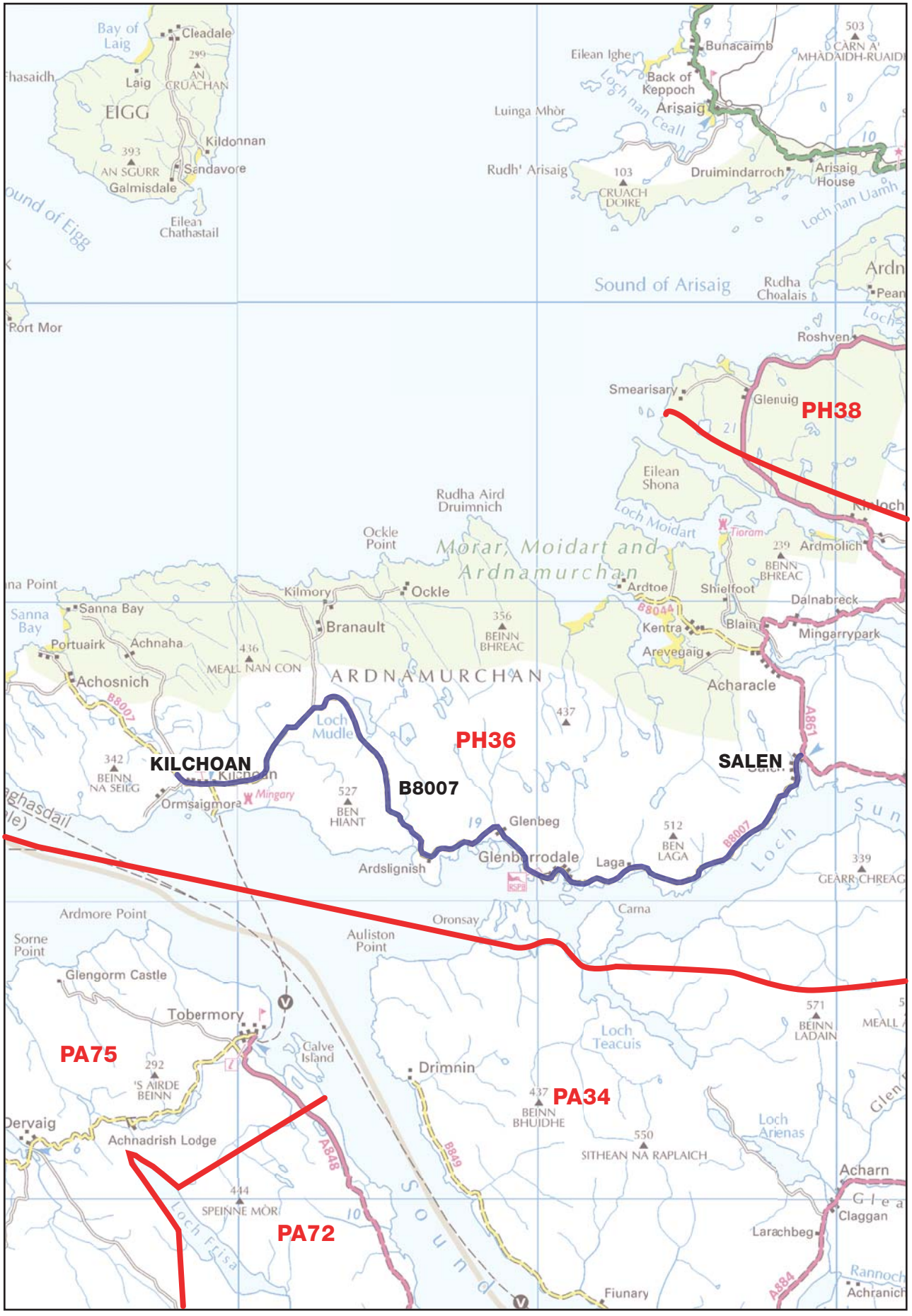

Figure 1: B8007 SALEN TO KILCHOAN

2.2.4 The indices of deprivation presented in Table 4.3 of the main report imply that Ardnamurchan is more affluent than Scotland as a whole. However, it is generally recognised that these data can be distorted by the relatively high levels of car ownership that typify communities within the Highlands and Islands of Scotland. The remote nature of the communities and low levels of public transport services result in private car ownership becoming a necessity.

2.2.5 An alternative approach to assess economically and socially disadvantaged parts of the Highlands and Islands is the Fragile Areas definition. A full description of this can be found in Section 4.4.8 of the main report, but in summary, it uses 12 criteria across three categories: geographic, demographic and economic, to assess whether a region can be considered economically and socially disadvantaged. Ardnamurchan is classified as a 'Fragile Area' under this assessment process.

2.2.6 In addition Ardnamurchan is also designated by the Scottish Executive as Initiative at the Edge (IATE)[2] areas. This is a partnership programme which aims to give communities "*the power to identify their needs, required actions and develop projects accordingly*".

2.2.7 The fish farming industry constitutes a major employer in the area with around 30 employees in Loch Sunart. Estimates of haulage quantities using the B8007 are in the region of 5,000 tonne/annum.

2.2.8 Agriculture and Forestry are also important sectors with over ten people employed on the main agricultural estate in the region and a further four residents working as self-employed contractors within the forestry sector. The Forest Enterprise has significant harvesting operations planned that will impact upon the haulage rates for the B8007.

2.3 ***Existing Road Conditions***

2.3.1 The current route is all single-track with an average carriageway width of only 2.7m. Passing places are provided every 75m, on average. Whilst the route does not have any width or weight restriction orders the practical constraints of the

[2] Ardnamurchan is an existing (pilot) IATE area. Jura and Glenelg will enter IATE on 1st April 2004. Areas in the Western Isles will also enter the IATA in 2004/05.

single-track carriageway limit the length of vehicles that can easily use the route. The route suffers from poor lines of sight and is generally in a poor state of repair.

2.3.2 The traffic count data provided be the Council indicated that the average two-way, 24-hour traffic flow across the year is 299 vehicles. This count was taken just southwest of Salen. It is estimated that only a proportion of these trips will have a final destination in Kilchoan. As a proxy therefore only 50% of these trips are have been estimated to benefit from the full extent of the scheme upgrade. This generates a two-way, 24-hour trips flow for the route of 150 vehicles.

2.4 ***Proposed Improvement Scheme***

2.4.1 The proposed scheme is relatively small in scale with an estimated scheme cost in the region of £2.0M across the 31km route. This gives an estimated cost per km of just £65k.

2.4.2 The scope of the works includes widening sections of the single-track route, in particular around bends in order to help improve lines of sight, as well to reduce restrictions on the length of HGVs that can use the route. Some re-surfacing will be undertaken, along with the provision of additional passing places across the route.

2.4.3 Further small-scale works on structures and drainage will be undertaken where required. In order to manage the growing tourist traffic using the route improved signage will be provided along with lay-bys and picnic areas.

3 Assessment of Scheme Impacts (Salen to Kilchoan)

3.1 ***Impact on Journey Times and Reliability***

3.1.1 Data provided by the Highland Council indicates that average speeds across the entire route are currently below 40km/hr. Despite the relatively low traffic flows (300 vehicles per day) delays occur as a result of conflicts in vehicles movements along what is an entirely single-track route.

3.1.2 The Council believes that the enhancements to lines of sight plus the provision of additional passing places will allow much smoother progression of traffic along the route. They estimate that average journey times between Salen and Kilchoan could be reduced by 16 minutes. This would translate to a journey time of just 41 minutes against the current 47 minutes. This represents a 13% reduction in journey time.

3.1.3 The estimated improvement in journey time would translate to an average speed across the route of just over 45km/hr. This represents a realistic target given the scale of the investment and type of works.

3.1.4 An Improvement in journey time reliability is also expected as a result of the anticipated reduction traffic conflicts. It is estimated that 'average delay' (as described in Section 3.4.15 of the main report) could fall by 2.2 minutes per trip.

3.1.5 Vehicle operating costs are anticipated to fall as a result of higher average speeds along the route and improved road surface conditions. Fuel costs would fall as a result of the shorter journey times with less requirement to accelerate and decelerate along single track sections. Non-fuel costs would fall as a result of less wear and tear on vehicles through improved road surfacing. Overall vehicle operating costs (as described in Section 3.4.7 of the main report) have been estimated to fall by around 7.5 pence per existing trip.

3.2 ***Diversionary Impacts***

3.2.1 The B8007 from Salen to Kilchoan is considered to offer an alternative route to road-based trips between certain origin–destination pairs. As such the proposed upgrades to the route may result in some traffic diverting from other roads to take advantage of the reduced journey times and improved reliability on the B8007.

3.2.2 In particular the following two generic trip types are considered to offer potential for diversion away from other routes to the B8007:

- Fort William to North Mull
- Mallaig to South Mull

3.2.3 Analysis of journey times indicates that diversion is most likely occur along the former route with road users choosing to travel along the B8007 and use the Kilchoan to Tobermory Ferry rather than alternative routes utilising the Localine to Fishnish Ferry. In the same manner diversion may also occur from traffic travelling from Mallaig to North Mull.

3.2.4 It is difficult to accurately assess the potential levels of diversion due to the absence of origin – destination travel data for the region. This makes it difficult to estimate traffic volumes. Furthermore, the inclusion of a ferry crossing as part of the journey means diversion rates are likely to be highly dependant upon ferry frequencies, which is difficult to model.

3.2.5 As such an estimation of potential diversion has been made utilising two known factors i) the level of base traffic flows on the B8007 and ii) the scale of the journey time improvements as a proportion of overall route travel times. The latter has been used to generate a 'diversion scale' across three levels representing the likelihood of diversion - low, medium or high. These levels have then has then been translated into factors to apply to the base traffic flows in order to give an estimated increase in traffic flows along the route. Section 3.4 of the main report provides a detailed description of this methodology.

3.2.6 Utilising this methodology the Fort William to North Mull route is classified as having 'medium' potential for diversion, as does the Mallaig to South Mull route. These translate to a central forecast level of diversionary trips of 6 per day.

3.3 ***Generated Traffic***

3.3.1 Section 3.4 of the main report provides details of the methodology undertaken to assess the likely levels of generated traffic. To summarise, within the TEE analysis a journey time elasticity of -0.2 has been applied i.e. a 10% reduction in journey time will result in a 2% increase in traffic flows through generated trips. This approach has been taken in order to incorporate a measure of generated traffic within the TEE analysis. A wider assessment of the impact of the schemes on

economic activity and subsequent traffic generation is undertaken within the EALI analysis.

3.3.2 Applying a –0.2 elasticity to the forecast journey time saving of 13%, along with a base flow of 150 vehicles, gives a forecast traffic generation of 4 trips per day.

3.4 Accident Reduction Impacts

3.4.1 The reported number of accidents along the B8007 is extremely low. No fatal or serious accidents have been reported within the last five years, with only two slight accidents (see Table 4.6 of the main report)

3.4.2 Historical evidence tends to indicate that a large proportion of 'damage only' accidents are often not reported. Furthermore data suggests that 'damage only' accidents make up a high proportion of accidents on single-track roads[3]. It is therefore feasible that a much larger number of accidents may have occurred during the period than reported.

3.4.3 None-the-less the level of accident, reported and unreported, is unlikely to be substantial and, as such, there is little margin for scheme benefits from accident reduction.

3.4.4 The scheme itself should help to reduce the potential for accidents, in particular between on-coming traffic. Improvements in lines of sight and widening of bends should reduce the likelihood of vehicles collisions.

[3] J.C. Tomlinson & A.M. Ross, "Accidents on Single Track Roads" 1988

Table 3.1: Summary of Scheme and Estimated Impacts (Salen – Kilchoan)

Description of Scheme Upgrade	Widening and re-surfacing, improvements in lines of sight. Estimated scheme costs = £2.0m Scheme cost per km = £65k	
Impact on Journey Times	It is estimated that journey times along the route could improve by an average of 16 minutes Estimated existing JT = 47 min Estimated post-scheme JT = 41 min	
Diversionary Impacts	**Competing routes**	**Estimated diversion**
	Fort William to N Mull	Medium
	Mallaig to S Mull	Medium
Generated Traffic	Assumed journey time elasticity of –0.2 13% reduction in JT = 2.5% increase in traffic	
Accident Reduction Impact	Very low levels of reported accidents Scheme should improve safety levels	

4 Transport Economic Efficiency Analysis (Salen to Kilchoan)

4.1 ***TEE Analysis***

4.1.1 As described above, the pre and post-scheme average journey time data indicates that considerable journey time savings may result from this scheme. The estimated 6 minute journey time saving, along with reductions in 'average delay' of 2.2 minutes, translates to an existing user benefit of just over 7.5 pence per vehicle trip plus 86 pence per person trip. With the base volume of vehicle trips at 150 and vehicle occupancy of 1.41 this gives a central forecast for existing user benefits of £70k per annum.

4.1.2 Section 3.2 above describes the assessment of potential 'diversionary benefits' deriving from the scheme. A broad-brush forecast of around 6 trips per day is estimated. This translates to around £2k per annum, based on the assumption that each diversionary trip derives half the marginal benefit of each existing users of the scheme.

4.1.3 Section 3.3 above describes the assessment of potential 'generated trip' benefits deriving from the scheme. Despite the estimated high proportional reduction in journey times the level of generated trips is low due to the base volume of trips along the route. The central forecast of 4 trips per day translates into a generated user benefit of £1k per annum.

Table 4.1: TEE Results (Salen – Kilchoan)

Base Trips Matrix (vehicles trips/day)	Average Journey Time Savings	Existing User Benefits (£k/yr)	Diversionary Impact (trips/day)	Diversionary User Benefits (£k/yr)	Generated Trips (trips/day)	Generated User Benefits (£k/yr)	Total Users Benefits (£k/yr)
150	6	70	6	2	4	1	**73**

4.1.4 Overall total user benefits are therefore estimated to be in the region of £73k per year.

4.2 ***TEE Sensitivity Testing***

4.2.1 Sensitivity tests have been carried out on the TEE results in order to illustrate the potential variation in scheme benefits. The central forecasts are based on the data inputs as described above.

4.2.2 The low forecasts assume that only half the estimated journey time-savings are actually achieved by the scheme. So, rather than journey times along the B8007 falling from 47 to 41 minutes, the low forecast assumes a journey time of 44 minutes. In addition the base trips/day are assumed to be 25% lower. This impacts upon 'existing-user' benefits, 'diversionary-user' benefits and 'generated-user' benefits. Furthermore, the journey time elasticity applied to estimate generated traffic is assumed to be only –0.1.

4.2.3 The high forecast assumes an additional 20% reduction in journey times is achievable over-and-above that within the central forecast. So the journey time along the B8007 is assumed to fall to just under 40 minutes. In addition the base trips/day are assumed to be 10% higher. Furthermore, the journey time elasticity applied to estimate generated traffic is assumed to be –0.3

Table 4.2: TEE Benefits (£k/yr) – Central, Low and High Forecasts (Salen – Kilchoan)

Central Forecast	Low Forecast	High Forecast
73	**28**	**98**

4.3 ***Present Value of TEE Benefits***

4.3.1 Table 4.3 indicates the present value of the TEE benefits over 30 years for the central, low and high forecasts.

Table 4.3: Present Value of Benefits (£M) - Central, Low, High Forecasts (Salen - Kilchoan)

Central Forecast	Low Forecast	High Forecast
1.4	**0.6**	**2.0**

* assumes 3.5% discount rate

5 Economic Activity Locational Impact Analysis (Salen to Kilchoan)

5.1 ***Introduction***

5.1.1 A marginally different approach has been undertaken to analysing the indirect economic benefits from the Salen to Kilchoan scheme in comparison to the other 'case studies'. This is because an assessment of the social and economic impact of the proposed B8007 upgrade has already been undertaken as part of the Highland Council ERDF Application (2001). Rather than repeat this work it was therefore decided to utilise the information collected. As such no business surveys were carried out for this scheme.

5.1.2 The section below therefore summarises the data collated within the ERDF Application.

5.2 ***Summary of Highlands Council ERDF Application***

5.2.1 The key findings were as follows:

- The area has suffered decline and lost much of the younger population due to a lack of education and employment opportunities. Retention and attraction of economically active people is therefore a key priority;

- The major employment sectors, fishing and agriculture, account for a third of all jobs within the area. Both industries are highly dependant upon the B8007 and are constrained by its current condition;

- Aquaculture employs a notably number of people, many of whom use the B8007 to travel to work. In addition 5,000 tonnes of produce per annum is transported out along this route;

- The agricultural industry requires the road network to transport live animals, with the excess journey times resulting in additional costs. Feed for the animals must also be transported into the area;

- Tourism is of importance to the Ardnamurchan peninsula, in particular 'green tourism' associated with natural vegetation. Concerns are often voiced about

the safety of the B8007 for large volumes of tourist traffic. The travel times along the B8007 are also considered to discourage visitors to the area;

- The B8007 is considered to place constraints on the delivery of supplies to the peninsula. The majority of supply organisations prefer to deliver in bulk due to the excess journey times. This means it can be very difficult for local business to react to unforeseen changes in demand. In the low season some carriers often refuse to deliver to the area if orders are too small;

- The Forest Enterprise plans to begin major harvesting in the Ardnamurchan area within the near future. If successful this could raise the employment profile of the area. However, the capability of the B8007 to sustain the required level of haulage is seen as a potential problem;

- The local authority and government organisation would like to promote the use of public transport in the area however the condition of the B8007 make it difficult to operates service efficiently and safely;

- Expansion of educational facilities has lead to an increase in school transportation journeys, with further increases anticipated.

5.2.2 The report concludes that the B8077 is clearly crucial to local businesses and the local community of the Ardnamurchan peninsula. In order to facilitate increased employment opportunities, improve safety, boost tourism and help stem the loss of economically active members of the population significant road improvements are required.

The lifeline route into a remote rural community such as Ardnamurchan can be seen as a vital part of the local infrastructure and one which supports much of the local employment. Degradation of the road could therefore result in significant social and economic disadvantages in the area.

5.3 ***EALI Conclusions***

5.3.1 The prevailing economic conditions in Ardnamurchan suggest that the proposed upgrade to the B8007 could have an important impact on promoting economic activity. Such is the scale of the upgrade it is likely to have a noticeable effect on journey times and journey reliability.

5.3.2 The improvements should provide a stimulus to the local economy of Ardnamurchan by enhancing accessibility. Traditionally the area suffers from supply-side problems with suppliers only wishing to deliver in bulk as a result of the excessive journey times. The road improvements should cut these journey times and improve reliability and thus help to ensure the long-term economic and social sustainability of the peninsula.

5.3.3 The existing primary industries of fish farming and agriculture should be enhanced through transport cost reductions both for supplies and delivery of goods to markets. The road improvements may also lead to expansion in these and other primary industries. The Forest Enterprise has identified potential sites for harvesting within the peninsula, however, without a road of suitable capacity, it may not be feasible to pursue these opportunities. Upgrades to the route should therefore help stimulate this economic activity.

5.3.4 Reduced journey times and greater accessibility should also encourage more tourism within the peninsula. At present the area loses out to alternative attractions due to the poor accessibility. The improvements could reverse this balance. In particular more people may be encouraged to use the route to access the Kilchoan to Tobermory ferry route to access Mull.

5.3.5 Limitations within the data set make it is difficult to accurately assess GDP or employment impacts. In particular business survey data was not collected for this route. However, benefits derived from improved accessibility are estimated to be of a magnitude to help ensure the long-term sustainability of economic and social activity on the peninsula.

6 Conclusions (Salen to Kilchoan)

6.1 ***Overall Scheme Evaluation Conclusions***

6.1.1 The aim of the Salen to Kilchoan scheme is to improve the levels of accessibility within Ardnamurchan and to provide improved access to the ferry service from Kilchoan to Tobermory. The analysis has demonstrated that the current road provision acts as a constraint to both the primary industries, reliant on the route as a means of transporting goods, as well as the tourism industry, that require good accessibility to encourage visitors.

6.1.2 Direct transport benefits deriving from the journey time savings are estimated to be significant and may be of sufficient magnitude to justify the forecast capital cost expenditure (£2.0) by themselves. The present value of benefits over 30 years is estimated to be in the region of £1.4M, although there is considerable variation within the low and high forecasts (£0.6M - £2.0M).

6.1.3 Significant indirect impacts upon the local economy within Ardnamurchan are also anticipated. The historical primary industries in the area, aquaculture and agriculture, will benefit from a reduction in transportation costs resulting from the improved journey times and reliability. The tourism industry should likewise benefit from increased visitor numbers to the peninsula. There is also potential for new economic activity within the forestry industry with the improved accessibility allowing areas to be opened up to harvesting. This would provide a significant economic boost the area.

6.1.4 Accident rates along the B8007 are very low indicating little potential for reduction benefits in this area. However, the scheme will have positive safety benefits through the widening of sections of the route and the provision of an enhanced carriageway.