

BRESSAY LINK STAG APPRAISAL – SUMMARY

1 INTRODUCTION

The project aim was to provide an affordable, efficient, flexible and sustainable transport link between Bressay and Mainland Shetland.

This document provides a summary of the STAG (Scottish Transport Appraisal Guidance) process which has been followed to identify the most appropriate option to meet this aim. The study has involved the community and other stakeholders at relevant stages as recommended by the guidance and to ensure that the process was informed by local input.

2 KEY ISSUES

The main issues identified by the stakeholders at the beginning of the study were:

- a belief that Bressay is not currently conducive to business expansion or new development;
- that employment based on Bressay is heavily reliant on the ferry;
- that it is unclear whether there are real constraints on the economic development of Lerwick at the current time, from lack of suitable land for development, as different perceptions were given by different people;
- some people considered that there were difficulties over land ownership in Lerwick and about the affordability of available land;
- that it was unclear whether opening up Bressay to development (by providing a fixed link) would be positive for Lerwick in the future or have a negative impact by, for example, leaving vacant properties on the Mainland;
- that previous debate over a long time period was detrimental to developments in the harbour area and was difficult for local residents;
- the lack of decision about the link (not the nature of the link itself) means that owners of land are not selling land and this is a barrier to development;
- a fixed link could provide opportunities to sustain the Bressay community but the design of this link would have to ensure that LPA would be able to continue to 'manage, maintain, and regulate the Port and Harbour of Lerwick, including the undertaking to improve and deepen the harbour area' in the interest of industries operating in the harbour, so as to ensure their business potential can be achieved;
- the overall cost of the current service to travellers is considered to be high. The ferry has to be used to access most opportunities off the island and can be expensive to visitors staying on Bressay;
- it was recognised that it is important to consider how any new infrastructure could affect the environment including in terms of carbon emissions and in retaining remote biologically diverse areas of the island and of neighbouring Noss;
- some stakeholders considered that a fixed link could lead to a loss of island identity and associated social benefits, such as knowing everyone in the community; feeling and being safe; and using the ferry as a social hub;
- there is heavy reliance on Lerwick and Mainland by Bressay residents for employment, services, leisure and learning as opportunities are relatively limited on the island itself;
- restricted access sometimes denies access to opportunities available on the Mainland (eg social activities; shift working etc);

- there is a lack of accessibility for those residents without access to a vehicle and who are unable to walk to the ferry as public transport and taxi provision is limited on Bressay and is not always convenient;
- there is an ageing population on Bressay and associated with this are difficulties in being able to provide adequate services: residents may not always get the service they need or equality of community care as service as compared with the rest of Shetland as services have to be planned to fit with the ferry timetable;
- there are some ongoing problems with recruiting staff for community posts because living in Bressay carries extra travel costs as compared with living in Lerwick;
- there are difficulties in accessing Bressay out-of-hours, unless the ferry is called out in a blue-light emergency;
- there is a lack of integration between the ferry service and bus services on the Mainland;
- some stakeholders queried whether the current service is sustainable and whether in terms of Shetland's finances the inter-island ferry service is sustainable in the long-term compared to fixed links; and
- the unresolved decision about a fixed link is resulting in other aspects of the community's development not being addressed, for example road improvements and public transport provision.

These issues were confirmed throughout the study and were used to underpin the team's understanding of problems with the current transport provision between Bressay and the Shetland mainland.

3 STAG PART 1 APPRAISAL

Strategic workshops assisted in the development of local planning objectives (Appendix B) and, with the help of the community, a long list of options was identified for further consideration.

These options were then appraised against the identified planning objectives. At an early stage the following options were sifted out:

- **Causeway:**
 - It was considered that this option could cause significant problems to operation of Lerwick Port, and the economic activities that it supports. For example the port would be split in two, not enabling boats to move around easily; requiring two sets of tugs to operate; and constraining activities such as decommissioning;
 - there were also safety issues: for example the lifeboat would be on one side, unable to quickly reach incidents in the other direction, and build up of shipping in one area, rather than another; and
 - there were environmental issues, as it would cause silting of harbour and increased fuel used of boats moving from one side of the harbour to the other, around Bressay.
- **Transporter Bridge:**
 - This option was rejected because of the increased journey time associated with it; potential constraints of use in poor weather; constraints on harbour activities; and potential visual impact.
- **Helicopter Service:**

- This option would be unable to take vehicles; unable to take many passengers or much freight and could have associated safety issues. It was recognised that the option could be used in combination with other options, but was likely to be too expensive to be sustainable.

The remaining options were taken through the Part 1 STAG appraisal, with the following being eliminated as a result of the findings:

- **Chain Ferry**

- This option would require higher levels of capital investment than the existing ferry service (operating the ferry and back up for overhaul/maintenance). Slipways would need to be constructed on either side at a new location and operational costs would not be significantly lower than the existing service (manning levels would be similar to current operation to ensure the ability to safely evacuate a vessel in an emergency situation);
- the Maritime and Coastguard Agency (MCA) code of practice will only consider issue of a certificate allowing a chain ferry to operate in Category A-C waters¹; Bressay Sound is categorised as a Category D water;
- the ferry could cause a level of disruption to Lerwick Harbour operations, depending on the frequency of service, because the Master of the ferry generally has to ascertain that the way is clear, before leaving shore, and vessels less than 50m long have to give way to the ferry when it is crossing. Mariners also have to be warned not to pass directly in front of the chain ferry and the draught behind the ferry can also be restricted by the chain;
- the location would have to be from the Point of Scatland or Greenhead, in order to function effectively. The crossing time would be approximately three minutes, but the overall journey time would be slower, as the link would not be so central, and there would be additional time for embarking and disembarking. The Point of Scatland is being developed and land for a slip is now constrained;
- information from Sandbanks, via Tor Point, has highlighted the need to have an appropriate system of chains such that they would not get destroyed on the sea bottom, or interfere with boats using the Sound. This would require substantially more dredging of the navigation channel than for other options, to create a graded edge in order to prevent abrasion of the chain on the edge of the dredge channel. This would increase the costs of the option significantly;
- the ferry must travel in a straight line, along the chain, limiting manoeuvrability. The service could also be adversely affected by sea conditions, particularly waves; and
- there are some safety issues, because chain ferries have no means of steerage if the chain were to break.

- **Immersed Tube Tunnel:**

- The capital costs involved in building this option would be high compared to a drill and blast tunnel, because of the depth of dredging the trench required (up to 18m) and the cost of transporting tunnel sections to Shetland or of constructing holding ponds locally to construct the sections in Shetland;
- there is a potentially greater environmental impact, particularly during construction, because of the activities required to facilitate construction;
- there is a high degree of risk in floating or craning in sections of tunnel in Shetland's climate and sea conditions; and

¹ Category A: narrow rivers and canals where the depth of water is generally less than 1.5m; Category B: wider rivers and canals where the depth of water is generally more than 1.5m and where the significant wave height could not be expected to exceed 0.6m at any time; Category C: tidal rivers and estuaries and, large, deep lakes and lochs where the significant wave height could not be expected to exceed 1.2m at any time

- in excess of 250,000m³ of rock would be removed and need to be disposed of with associated high costs (and if no reclamation site were found potentially adverse environment impacts).
- **Opening Bridge:**
 - Operational costs would be higher than for other fixed link options, due to required maintenance and manpower costs;
 - it would place some constraints on the current activities of Lerwick Harbour, for example, it would have to be opened to enable to allow any pelagic fishing boats to pass through;
 - access would be unpredictable: from when the bridge begins to open it would require up to 30 minutes wait (opening and closing time of 5-15 minutes each way and time for the vessel to pass through). The frequency of opening is not known, but the unpredictability to those using the link could present access issues and could prevent integration with other transport services, including external connections. There would be a deterioration in level of provision of access for emergency services at these times; and
 - under certain extreme weather conditions opening would be prevented.

4 STAG PART 2 APPRAISAL

4.1 OPTIONS FOR APPRAISAL

The options appraised at STAG 2 are as follows:

- **Option 1: Drill and Blast Tunnel:** Option covers the construction of a tunnel by drill and blast techniques in the rock beneath the Sound of Bressay on an alignment between Point of Scotland and Hoegan. The tunnel would allow bi-directional traffic movement with provision for a 2m cycle way/footpath and a 1.05m hard shoulder.



- **Option 2: High Level Bridge:** This option covers a high level bridge with an airdraft of 60m above MHWS over a 260m wide channel. The bridge would also be provided with wind shielding. It would allow two directional traffic and would have a 2m combined footway/cycleway on one side and a 0.6m wide verge on the other.



- **Option 3: Reconfigured Ferry Service:** This option is for an enhanced ferry service, which includes a lengthened operational day and some increase in the frequency of sailings at certain times of day to address issues raised in consultation about access and integration. The service would operate:
 - Sunday to Thursday: 0545 (depart Bressay) to 2400 (depart Lerwick) – 18.5 hour service;
 - Friday and Saturday: 0545 (depart Bressay) to 0145 (depart Lerwick) – 20.25 hour service;
 - In addition there would be an improvement in the service on a Sunday morning, returning to that prior to the introduction of Sunday maintenance and drill period.

Fare levels are considered to be a major issue by those using the ferry and thus Option 3 has been considered on the basis of three fare levels:

- Retaining the current fare structure;
 - removal all fares;
 - a more sophisticated structure reflecting issues raised during the first stage of consultation (see Section 7.5.3 for more information).
- **Option 4: Do Minimum (Existing Ferry Service, used for comparative purposes):**
 - The first service of each day departs Bressay at 0700 hours, and departs Lerwick at 0715 hours.
 - Monday to Thursday there are twenty-one crossings each way, in the main on an hourly basis, but more frequently at peak times, including lunch time.
 - On a Friday and Saturday there is an additional service at 2330 and 0045 departing Bressay and 2359 and 0100 departing Lerwick.
 - On a Sunday there are fewer crossings during the morning, compared to other days, to enable maintenance and drill period.
 - Passenger costs are as follows:

- Adult – return: £3.30
 - 10 return journey ticket: £15.80
 - Children, up to 16 – return: £0.40
 - 10 return journey children’s ticket: £2.80
 - Concessionary SIC Pass Holders – no charge
- Vehicle costs (fares include driver) are as follows:
 - Motorcycles – return: £6.00
 - Vehicles up to and including 5.50m – return: £7.80
 - 10 return journey ticket: £62.00
 - Limited post car service.
 - **Additional: Public Transport Measures**
 - Timetabled along main route, with options to phone on for service from the more minor routes.
 - This would be for a midibus, suitable for 30 passengers with Options 1 and 2, and a 7-seater car, suitable for 6 passengers, for Option 3.
 - Three sub-options have been considered in terms of frequency of the provided service.

4.2 FINDINGS

The options have been appraised against the Government’s five transport objectives for environment, safety, economy, accessibility and integration. A detailed assessment has been made of the fit of each option with the Government and the local planning objectives and the scope and scale of the benefits and impacts associated with each option have been considered.

A summary of the key findings is provided below.

4.2.1 Community

- There are issues relating to the current ferry provision. These are mainly linked to the level of provision and fares.
- The ferry forms an important part of Bressay life.
- The community is dependent on the ferry to access basic facilities on the Mainland (doctor, retail and leisure facilities, childcare provision etc).
- Current public transport provision on the island is very limited.
- Annual spend on ferry fares can be considerable for some members of the community.
- If a fixed link is provided alternative jobs for the ferry crew would be found.
- There is an urgency to make a decision about the link, to relieve uncertainty, in particular for the community of Bressay, and an urgency to address the identified issues relating to the current link.

4.2.2 Environment

- Local planning policy supports a bridge and this would have to be changed if another option is taken forward.
- The ferry options (Options 3 and 4) would impact least on the local environment because no (or only limited) new infrastructure would be required.
- The fixed link options (Options 1 and 2) would generate traffic with associated increases in noise emissions etc.

- The tunnel (Option 1) would have less impact on the environment than a high level bridge because it would have less impact on surrounding land uses and less landscape and visual and related impacts.
- However, the tunnel (Option 1) would require the demolition of one shed belonging to LPA. Businesses using the property and others in the locality would be affected.
- No designated sites would be affected by any option.
- The tunnel option would have a smaller carbon footprint than a high level bridge or a reconfigured ferry service.

4.2.3 Safety

- No option has significant benefits or disbenefits in terms of safety although a fixed link may heighten community fears of crime.
- There is risk of more serious effects from fire in a tunnel (Option 1). The risk of accidents in a tunnel however has been demonstrated to be less than on the connected road network².
- There would be some risks working at height on a high level bridge (Option 2) in an exposed location during construction.

4.2.4 Economy

- The main economic driver that currently exists for an improved transport solution is the need to enhance the competitiveness and productivity of businesses based in Bressay and those businesses and organisations that trade or provide services in Bressay. There has been no significant need identified in the foreseeable future for Bressay to be opened up to release constraints on economic land for industrial, housing or harbour infrastructure in Lerwick or the surrounding areas.
- The bridge (Option 2) is expected to be a constraint in the harbour which could impact on the competitiveness of the port as a location for activity, particularly decommissioning activity. In addition, the construction of the bridge is expected to cause significant disruption to one of the largest employers in Shetland.
- Construction of a tunnel is also expected to cause disruption, particularly through the demolition of a LPA property which currently has a tenant. However, the impact would be much less than the impact anticipated for the bridge. In addition, due to the condition of the building the project may simply be bringing forward an inevitable outcome.
- Construction of a tunnel under the Sound would place some restriction on very deep dredging in the future but not on the planned -10m below CD dredge. LPA has confirmed that this is acceptable because a dredge to below -10m would require replacement of existing quays which would be very expensive.
- A fixed link option is expected to reduce the fragility of the Bressay economy and encourage investment in the island as both a place to live and work. In addition, the tunnel option provides the best value for money and therefore, for both of these reasons, emerges from the economic appraisal as the preferred option

4.2.5 Accessibility and Integration

- Fixed link options (Options 1 and 2) provide significant benefits in terms of access and integration because of the convenience of 24 hour access and

² Ongoing work by Faber Maunsell for SIC

the costs to users as long as improved public transport measures are included to address the needs of non-vehicular users.

- Enhanced public transport measures would be an essential part of any fixed link option to ensure that access was as possible for those without vehicular transport as at present.
- The ferry provides centre to centre access. This would only be possible with a fixed link for some people with good public transport links.
- The tunnel provides access at all times. Option 2 (the high level bridge) could have restricted access in times of bad weather even with effective wind shielding.
- It has been calculated that on the basis of the following assumptions: a drive time of 50kmph³ (tunnel) and 65kmph (bridge), cycling at 30kmph (but some cyclists would have to get off and walk up the incline on each) and walking at 5kmph, the 1200m of fixed link would take the following times to cross:
 - 1.2km @ 50km/hr would take 0.024hrs = 1.44 min = 1 minute and 26.4 seconds
 - 1.2km @ 65km/hr would take 0.018hrs = 1.11min = 1 minute and 6.5 seconds
 - 1.2km @ 30km/hr would take 0.04hrs = 2.4 min = 2 minutes and 24 seconds
 - 1.2km @ 5km/hr would take 0.24hrs = 14.4 minutes = 14 minutes and 24 seconds.

4.3 APPRAISAL

- Option 1, the drill and blast tunnel, is the option, which on balance is most able to address the issues associated with the current Bressay Link and best meets the project objectives. This finding is based on feedback from consultations and also from the detailed studies undertaken for STAG 2. Various sensitivity tests have been undertaken to test these findings in terms of the option's economic value but the findings remain the same.
- Option 1 would provide best value as demonstrated by the cost benefit analysis, and the appraisal of costs to Government over a 60 year appraisal period.
- The construction cost of the tunnel would be £26,339,000; operational costs would be £100,000 each year; the net present value (NPV) would be £16,833,385 and benefit to cost ratio 7.44.
- This finding is different from that made in the original bridge study because the 60m x 260m bridge is considerably more expensive than a bridge with a 40m air draft and 134m span and current standard tunnelling techniques have reduced tunnel costs.

4.4 FUNDING

- It is not clear at this stage how a fixed link could be funded and further work and discussions would be required to clarify this.

³ Kilometres per hour

Table 1: Summary Appraisal of Options**Key:**

- ✓✓✓ Good fit with objective
- ✓✓ Moderate fit with objective
- ✓ Fit with objective
- Neutral
- x Minor non compliance with objective
- xx Moderate non compliance with objective
- xxx Major non compliance with objective

Aim, Government and Local Planning Objectives	Option 1 – Drill and Blast Tunnel	Option 2 – High Level Bridge	Option 3 – Reconfigured Ferry	Option 4 – Do Minimum
Aim: To provide an affordable, efficient, flexible and sustainable transport link between Bressay and Mainland Shetland	✓✓✓ Tunnel provides 24hour link and with enhanced public access would be improved for all. Option generates traffic but is flexible and affordable	✓✓ Bridge provides 24hour link, apart from in most extreme weather conditions, and with enhanced public access would be improved for all. Option generates traffic and has high cost. Perceived risk to Port activities	✓ Provides improvements in transport provision. High capital and operating costs	* Issues will remain and high capital and operating costs
Economy: Promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency	✓✓✓ Tunnel provides 24 hour link. Provides opportunities for economic development in Bressay	✓✓ Bridge provides 24 hour link. Provides opportunities for economic development in Bressay, could create perceived constraint on Port activities	✓ Improvement over Do Minimum, but does not meet all issues raised	- No change
Ec1: To enhance the transport infrastructure between Bressay and Mainland Shetland to ensure the long-term sustainability of the Bressay community	✓✓✓ Tunnel provides 24 hour link. Public Transport measures required to ensure effective link for everyone within the community	✓✓ Bridge provides 24 hour link, apart from in most extreme weather conditions. Public Transport measures required to ensure effective link for everyone within the	✓ Better provision than current service. Public Transport measures required. Option remains susceptible to future changes in ferry fares and prices	* No change so no improvement

Aim, Government and Local Planning Objectives	Option 1 – Drill and Blast Tunnel	Option 2 – High Level Bridge	Option 3 – Reconfigured Ferry	Option 4 – Do Minimum
		community		
Ec2: To provide a link which does not constrain Lerwick Harbour's current activities or its future expansion	✓✓ Tunnel could restrict dredging below -10m in the future (current LPA plans are only to dredge to -10)	* 60m aircraft and 260m main span mitigates main constraints. Perceived constraints remain	✓✓✓ Additional vessel movements, could be incorporated in existing harbour management	✓✓✓ No change
Ec3: To provide and promote a link which supports a stable and sustainable economy and enhances employment opportunities	✓✓ 24 hour access could affect local business on Bressay. This could be positive or negative. Improved opportunities to access employment	✓✓ 24 hour access could affect local business on Bressay. This could be positive or negative. Improved opportunities to access employment for Bressay	✓ Improved access to employment, but still restricted by timetables	** No change – constraints to access
Ec4: To provide a link which is affordable for users	✓✓ No direct cost, but increase in vehicle operating costs. Improved public transport	✓✓ No direct cost, but increase in vehicle operating costs. Improved public transport	**/✓✓ Would depend on fare structure implemented. Improved public transport	** Community consider costs are high relative to distance travelled and need to travel
Ec5: To provide a link which is sustainable for funders and value for money	✓✓✓ Sustainable for funders and value for money (capital outlay required)	✓ Sustainable for funders in long term (high capital outlay required)	*** High annual operational cost and additional replacement costs	*** High annual operational cost (less than option 3) and additional replacement costs
Accessibility: Promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network	✓✓✓ 24 hour access to and from island. However, could increase social exclusion if adequate public transport measures are not provided	✓✓✓ 24 hour access to and from island. However, could increase social exclusion if adequate public transport measures are not provided	✓ Better provision than current service, dependent on fare structure. Public Transport measures required to address issues	* Inclusive nature of centre to centre link and social hub provided by ferry. However, lack of public transport internal to Isle increases social exclusion
Ac1: To provide and maintain an accessible, efficient,	✓✓✓ Tunnel provides 24 hour link. Public Transport measures required to ensure	✓✓ Bridge provides 24 hour link, apart from in most extreme weather conditions.	✓ Better provision than current service, dependent on fare structure. Public	- No change

Aim, Government and Local Planning Objectives	Option 1 – Drill and Blast Tunnel	Option 2 – High Level Bridge	Option 3 – Reconfigured Ferry	Option 4 – Do Minimum
cost effective transport network for Bressay	effective link for everyone within the community	Public Transport measures required to ensure effective link for everyone within the community	Transport measures required	
Ac2: To provide a link which enables the Bressay community equal opportunities to access employment, services and facilities as other communities in Shetland	✓✓✓ Tunnel provides 24 hour link to employment, services, and recreation. Public Transport measures required to ensure equality of access	✓✓ Bridge provides 24 hour link to employment, services, and recreation, apart from in most extreme weather conditions. Public Transport measures required to ensure equality of access	✓ Better opportunities than current service, but some restrictions by timetable and cost. Public Transport would improve access to the ferry	* Current service does not meet Bressay's requirement to access opportunities on Mainland Shetland, because of cost and timetable constraints
Ac3: To provide a link which does not restrain opportunities for housing in Bressay	✓✓✓ 24 hour access to the island	✓✓✓ 24 hour access to the island	✓ Improvement over Do Minimum	- No change
Ac4: To maintain and improve accessibility and response times for emergency services and other service providers, including out-of-hours needs.	✓✓✓ Tunnel provides 24 hour link, enhancing provision for non-blue light emergencies and others	✓✓ Bridge provides 24 hour link, enhancing provision for non-blue light emergencies and others	- No change. Adequate emergency cover	- No change. Adequate emergency cover
Environment: Protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimise emissions and consumption of resources and energy	** Option would create emissions through traffic generation. Public transport measures are key to delivery of the option. Smallest carbon footprint of three options. Potential decrease in walking and cycling across the link might have negative impact on health	** Option would create emissions through traffic generation. Public transport measures are key to delivery of the option. Second smallest footprint of options. Potential decrease in walking and cycling across the link might have negative impact on health	** Increased use of fuel for additional services. Some improvement in public transport. Greatest carbon footprint of the three options	- No change
Env1: To develop a link to Bressay that recognises and	✓✓✓ Minimal environmental intrusion	✓ Landscape intrusion from major structure. Piers could affect sedimentation patterns	✓✓✓ No change	✓✓✓ No change

Aim, Government and Local Planning Objectives	Option 1 – Drill and Blast Tunnel	Option 2 – High Level Bridge	Option 3 – Reconfigured Ferry	Option 4 – Do Minimum
protects Shetland's unique environment and safeguards the natural, cultural and social heritage of the island				
Env2: To provide a link that seeks to minimise carbon emissions and the use of finite resources	✓✓Link would generate traffic but carbon footprint smallest of options	✓✓ Link would generate traffic. Carbon footprint second smallest of options	✓✓Less traffic generated than fixed link options. High carbon footprint	- No change
Env3: To promote a link that can accommodate current and future patterns of development and land use in Bressay	?✓✓24 hour access provided to and from island. Land use planning required to address patterns of development in Bressay, car park needs etc. Decision would resolve current uncertainties	?✓✓24 hour access provided to and from island. Land use planning required to address patterns of development in Bressay, car park needs etc. Decision would resolve current uncertainties	?✓✓ Enhanced access from present service. Decision would resolve current uncertainties	** No change. Current uncertainties about future link unresolved
Safety: Improve safety of journeys by reducing accidents and enhancing personal safety of pedestrians, drivers, passengers and staff	* Tunnel would generate traffic which could lead to increase in accidents. 2m segregated footway/cycleway provided through tunnel. Further consideration required about measures to ensure safety of non vehicular users	* Bridge would generate traffic which could lead to increase in accidents. 2m segregated footway/cycleway provided through tunnel. Further consideration required about measures to ensure safety of non vehicular users	- No change from current provision	- No change
S1: To ensure the link continues to maintain and enhance community safety and health	-/* Unable to determine any potential change in crime. However, community perception of increased fear of crime. Potential decrease in walking and cycling across the link might have negative impact on health	-/* Unable to determine any potential change in crime. However, community perception of increased fear of crime. Potential decrease in walking and cycling across the link might have negative impact on health	✓✓✓ Ferry provides constraint to open access to Bressay. Ferry enables people to not rely on a private vehicle	✓✓✓ Ferry provides constraint to open access to Bressay. Ferry enables people to not rely on a private vehicle

Aim, Government and Local Planning Objectives	Option 1 – Drill and Blast Tunnel	Option 2 – High Level Bridge	Option 3 – Reconfigured Ferry	Option 4 – Do Minimum
S2: To ensure the link does not compromise maritime safety or road safety	✓✓ Increase in road traffic could lead to increased numbers of accidents. No effects on maritime safety	✓ Increase in road traffic could lead to increased numbers of accidents. Perceived effects on maritime safety	- No significant effects	- No change
Integration: Improve integration by making journey planning and ticketing easier and working to ensure smooth connections between different forms of transport infrastructure, including air, ferry, bus, cycling and walking opportunities	✓✓✓ Combination of 24hour access and enhanced public transport provision improves integration	✓✓ Combination of 24hour access and enhanced public transport provision improves integration, apart from in most extreme weather conditions	✓ Better opportunities for integration than current service, but some restrictions by timetable and cost. Improved public transport to access ferry, required	** Does not integrate well with the wider Shetland transport system, but centre to centre link is an advantage
Int1: To provide a link which integrates with all Shetland's transport services	✓✓ Tunnel provides 24hour access, but reliance on private transport and not centre to centre. Public transport provision required to meet the needs of the whole community	✓✓ Bridge provides 24hour access, but reliance on private transport, apart from in most extreme weather conditions, and not centre to centre. Public transport provision required to meet the needs of the whole community	✓ Better opportunities for integration than current service, but some restrictions by timetable and cost. Improved public transport to access ferry, required	** Does not integrate well with the wider Shetland transport system, but centre to centre link is an advantage
Int2: To promote a transport link that facilitates the delivery of other committed plans and strategies	?/✓✓ Planning issues paper underdevelopment, but option helps deliver commitments in the Regional Transport Strategy	?/✓ Planning issues paper underdevelopment, but option helps deliver commitments in the Regional Transport Strategy. Does not meet all LPA objectives	- No significant effects	- No change

5 RECOMMENDATIONS

The key recommendations from this study are that:

- Option 1, the Drill and Blast Tunnel is taken forward.
- Public transport enhancement measures should be detailed and put in place to support the fixed link.
- Walking and cycling measures are promoted as part of the package.
- Funding mechanisms are thoroughly researched and thought through for delivery of all proposals. This process should ensure absolute clarity on any potential impacts on SIC resources.
- Short-term measures, such as enhanced public transport provision and a fares review should be taken forward in the short-term to address community needs.
- A working group is established, to include ZetTrans, SIC and LPA representatives to oversee the progression of the tunnel proposals.
- The legal issues surrounding development in the harbour are openly discussed to ensure the final proposals meet all parties' needs and aspirations.
- The legal framework for taking the proposals forward is defined and agreed.
- Land ownership issues are researched and detailed and the findings taken into account in the planning of the next stages of the project.
- Various further research and development work is progressed including:
 - further research on funding opportunities;
 - more work on utilities;
 - undertaking topographical surveys at portals and intrusive ground investigation on Lerwick approaches to allow confirmation of portal locations;
 - checks on extent of made ground at Gremista;
 - confirmation of tunnel design to approval in principle (AIP) stage;
 - reaching agreement with LPA on the shed to be demolished;
 - an environmental impact assessment (EIA) and identification of appropriate mitigation;
 - further research on appropriate levels of public transport provision;
 - checks on likely flood risks at the Lerwick portal;
 - confirmation of areas identified for reclamation in the harbour and identifying necessary consents;
 - effective consultations progressed with relevant statutory agencies, communities and relevant interests groups to ensure full understanding of constraints and opportunities; and
 - identifying timescales for all relevant work.
- As risks are investigated and better understood for the proposals, the level of optimism bias which has been applied (66% for the tunnel and 44% for the approaches) is re-assessed and used to help identify accurate budget figures for all parts of the project – a risk informed approach should be adopted in the development of a budget that is robust and auditable.
- SIC departments work together to identify the implications that a fixed link would present and identify potential issues which require to be addressed.
- Detailed discussions are progressed with affected parties (ferry staff, businesses, landowners and managers) following a Council decision to proceed.
- The SIC's Planning Service and others are engaged in effective pre-application discussions as required by forthcoming legislation.

- The role of the Bressay Link Group is considered and re-defined if found necessary.
- The impacts of major construction projects on Shetland are considered and if necessary that a staggered timetable is agreed.
- Regular updates on progress are given by the project team to SIC, the LPA, the community, the press and to all affected parties.

In addition it is recommended that:

- ZetTrans, in collaboration with the SIC's Ferry Service, should ensure data collection on the inter-island network is improved in order to provide data of a quality suitable for studies of this kind.
- The STAG model is developed for use in other project appraisals.