7 OPTIONS CONSIDERED FOR DETAILED APPRAISAL

7.1 INTRODUCTION

This section provides detailed information on all of those options taken forward to detailed appraisal. These options are:

- Option 1: Drill and Blast Tunnel
- Option 2: High Level Bridge
- Option 3: Reconfigured Ferry Service
- Option 4: Do Minimum (Existing Ferry Service, used for comparative purposes)
- Additional to Options 1-3: Public Transport Measures

In all options walking and cycling measures have been taken into account.

7.2 APPRAISAL ASSUMPTIONS

It is important that each of the options can be compared on a like-for-like basis, over time, to ensure that the appraisals and associated calculations are fair and accurate.

The following protocol enabled the options to be developed and appraised on an equal basis:

- 2010 was taken as the starting year for calculations i.e. earliest start of construction of a fixed link;
- evaluation period taken as 60 years;
- costs taken as 2008/09 values;
- capital costs spread over period of expenditure;
- residual value of asset at end of 60 year period discounted to present day values;
- discount rate for first 30 year period of 3.5%; and
- discount rate for next 30 year period of 3%.

Costs for each option are provided using the above protocol.

SIC is proposing to undertake basic improvements to the Heogan road on Bressay in 2008-09. Further improvements would be required to this road if a fixed link was implemented and cost for this work have been included in Options 1 and 2. This work would be to improve the road to 3.3m wide and a car and cycle could pass easily. At two blind summits on the road it would be made dual track.

In the future a third phase of work could be implemented if traffic levels reach the national advice of 1,000 vehicles per day. If this were to happen then a dual track road would be made between Heogan and Maryfield. SIC Roads Department would not anticipate that this would be necessary for some 10-30 years.

Government advises[16] that 'optimism bias' is included in the costings for major transport infrastructure projects. Optimism bias is the demonstrated systematic tendency for people to be over-optimistic about the outcome of planned actions. Optimism bias arises in relation to estimates of costs and benefits and duration of tasks. It should be accounted for explicitly in appraisals, if these are to be realistic. The recommended percentage cost to be added to cover optimism bias ranges between:

- Standard Civil Engineering 3% to 44%
- Non Standard Civil Engineering 6% to 66%

At present there is no requirement from Government to include optimism bias on new ferry options despite the unknown risks of what a ferry could cost some 60 years on. The two fixed link options, which have been appraised, would be classed as Non Standard Civil Engineering Projects. The construction costs given in this chapter are without optimism bias but in the TEE appraisal presented in Chapter 12 optimism bias is included at 66% for the fixed link options in the net present value (NPV) calculations and at 44% on the necessary new road works. In addition a series of sensitivity tests have been run for the TEE which include optimism bias at 66% on the reconfigured ferry option; at 44% for all options and at 0% on all options.

The costs provided for each option with optimism bias in Chapter 12 enable an assessment to be made to ensure the option chosen is good value for money, even when this additional risk factor is applied. In the next stages of developing proposals further work would be completed to reduce the level of optimism bias as risks were better understood and mitigated.

On the basis of the foregoing assumptions the following costs and information have been established for each option:

Option 1 – Drill and Blast Tunnel

- Construction costs over construction period for start date in 2010
- Construction period for tunnel
- Annual operation and maintenance costs on completion of construction
- Residual value of tunnel at end of 60 year period
- Cost of bus service (Sub-option B, see Section 7.8)
- Cost of upgrading Heogan Road

Option 2 - High Level Bridge

- Construction costs over construction period for start date in 2010
- Construction period for bridge
- Annual operation and maintenance costs on completion of construction
- Residual value of bridge at end of 60 year period
- Cost of bus service (Sub-option B, see Section 7.8)
- Cost of upgrading Heogan Road

[16] Treasury Green Book on Transport Project Appraisal, 2003 and associated guidance

Option 3 - Reconfigured Ferry Service
• Capital cost of ferries and terminals for replacement at 2012 and at 20 year intervals thereafter capital costs of terminal: replacement link span in 2015, 2035 and 2055; replacement pier structure in 2035 • Building period for ferries and terminals • Annual operation and maintenance costs • Annual revenue generated by ferry • Residual value of ferries and terminals at end of 60 year period • Cost of bus service (Sub-Option A, see Section 7.8)

Option 4 – Do Minimum: Current Ferry Service
• Capital cost of ferries and terminals for replacement at 2012 and at 20 year intervals thereafter • Capital costs of terminal replacement link span in 2015, 2035 and 2055; replacement structure in 2035 • Building period for ferries and terminals • Annual operation and maintenance costs • Annual revenue generated by ferry • Residual value of ferries and terminals at end of 60 year period

7.3 OPTION 1 - DRILL AND BLAST TUNNEL

The following sections summarise the more detailed information about the tunnel option contained in Annex G.

This option is to construct a single bore, two-way road tunnel using drill and blast techniques. The proposed alignment extends from Gremista Road, Lerwick to Heogan Road on Bressay, a length of 1200m. At its deepest point the road would be 43m below Ordnance Datum (OD). The cover above the tunnel would be a minimum of 25m to sea-bed level, which for the purposes of design is taken as -10mOD (see Annex G).

Consultations were carried out with Lerwick Port Authority (LPA) and the roads department of Shetland Island Council (SIC). The findings are summarised in Annex B.

7.3.1 Route Selection

In determining the horizontal alignment of possible crossings, the main objectives were:

- to minimise road gradients, adopting a maximum of 8%;
- to achieve road curvature to comply with British Standards;
- to portal (i.e. locate the tunnel exit) as close as possible to the centre of Lerwick and the population centre of Bressay;
- to have relatively level ground at the portals;
- to minimise effect on existing buildings and utilities wherever possible; and
- to have the shortest possible crossing.

A selection of routes have been considered and discounted[17 and 18]. Crossings to the centre of Lerwick were considered impractical from a technical and cost perspective. The technical reasons are given below. Shorter crossings north of the optimum alignment were considered but the distance from the centre of Lerwick and the portal position on Bressay were impractical from an end use

[17] Lerwick to Bressay Fixed Link, Tunnel Preliminary Feasibility Study carried out for Lerwick Port Authority by Donaldson Associates Limited, September 2005

[18] Lerwick to Bressay Fixed Link, Tunnel Stage 1 Study Report carried out for Lerwick Port Authority by Donaldson Associates Limited, November 2

perspective. The route shown in Annex G, Drill and Blast Tunnel Report (Figure JS553/101) is considered to be optimum in light of the above requirements.

The issue of route alignment was re-visited during the STAG process. There has been interest from stakeholders in the possibility of forming a tunnel that would portal (i.e. exit) closer to Lerwick town centre than that proposed for the optimum alignment. This has been reviewed and while there are many benefits from an end user perspective it is not considered practicable when compared with the Scatland to Heogan alignment. The reasons for this are as follows:

- the length of the tunnel would be much greater than the Scatland to Heogan alignment. This would significantly increase construction costs;
- the land in Lerwick rises steeply from the harbour front making it difficult to bring a tunnel to the surface over a short distance while keeping gradients to a minimum;
- there is little free land in Lerwick town centre where a tunnel portal and new link road and approaches could be constructed; and
- overcoming the difficulty in finding available land and reducing the length of the tunnel by reclaiming land and forming a tunnel portal in the harbour has been suggested by a stakeholder. This has been reviewed and the conclusion reached that this could not be achieved by any tunnel other than an immersed tube tunnel. The high financial cost, the disruption to shipping during construction and heightened environmental impact of this form of construction led immersed tube tunnels to be dropped from the assessment process at STAG 1 stage.

7.3.2 Proposed Link Road Alignment

In Lerwick, the new link road would connect to the Gremista Road at a 'T' junction just north of the Bod of Gremista. This would require junction upgrades. The new link road would run north eastwards along the shore of the marina and the junction with the Lower Gremista Road would be improved. The link road would decline from the 'T' junction and at chainage 165m it would enter a cutting (with 70° side slopes and a maximum depth of c.15m) which would be 185m long. Figures 7.1and 7.2 provide details of the proposals of the approaches to the tunnel on the Lerwick side.

At chainage 350m the road would enter the tunnel. The road would descend at a maximum gradient of 7% in the tunnel for a distance of about 500m to reach a maximum depth of about 40m below existing sea bed level (and some 45m[19] below Mean Low Water Springs, MLWS), approximately midway beneath the Bressay Sound. The road at this point is orientated east-west. The road then ascends towards Bressay at 8% gradient swinging to a more south easterly direction and exits via a portal approximately 18m deep on the Bressay side.

[19] The depth below MLWS cannot be defined accurately at present because water depth there at the moment at low water is 6m and following dredging will be 9m

Figure 7.1: Tunnel Alignment showing Details of Lerwick Approach

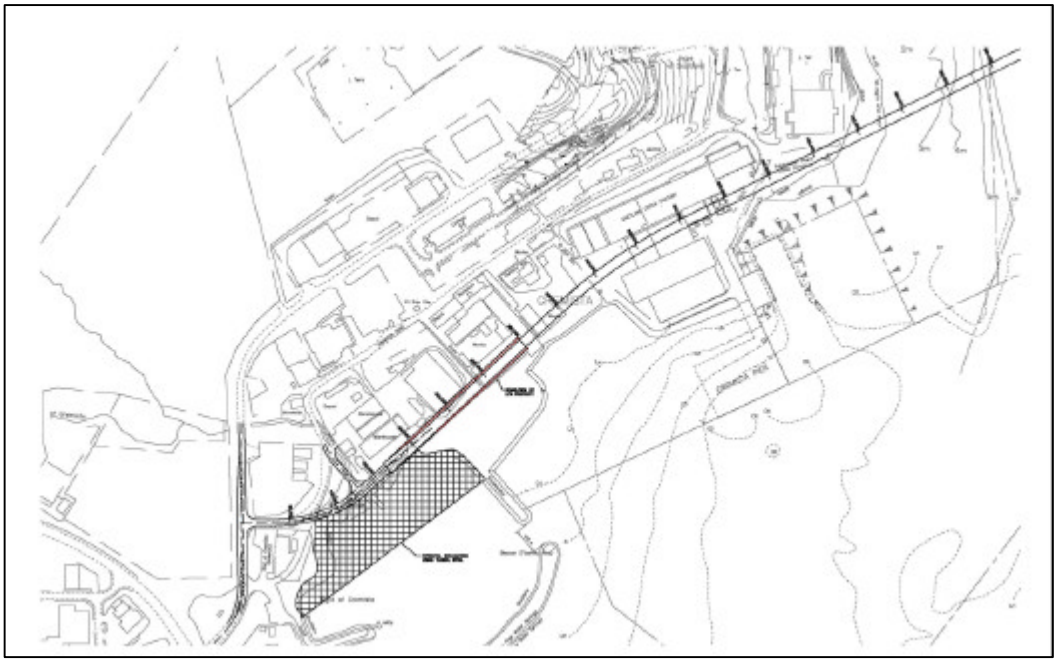


Figure 7.2: Area in which Tunnel would be aligned at Gremista Approaches

The road then passes between a cottage and the factory where it would allow connection to the existing Heogan Road. Figures 7.3, 7.4 and 7.5 below give details of the proposals for the tunnel approached on the Bressay side.

Figure 7.3: Tunnel Alignment Showing Details of Bressay Approach

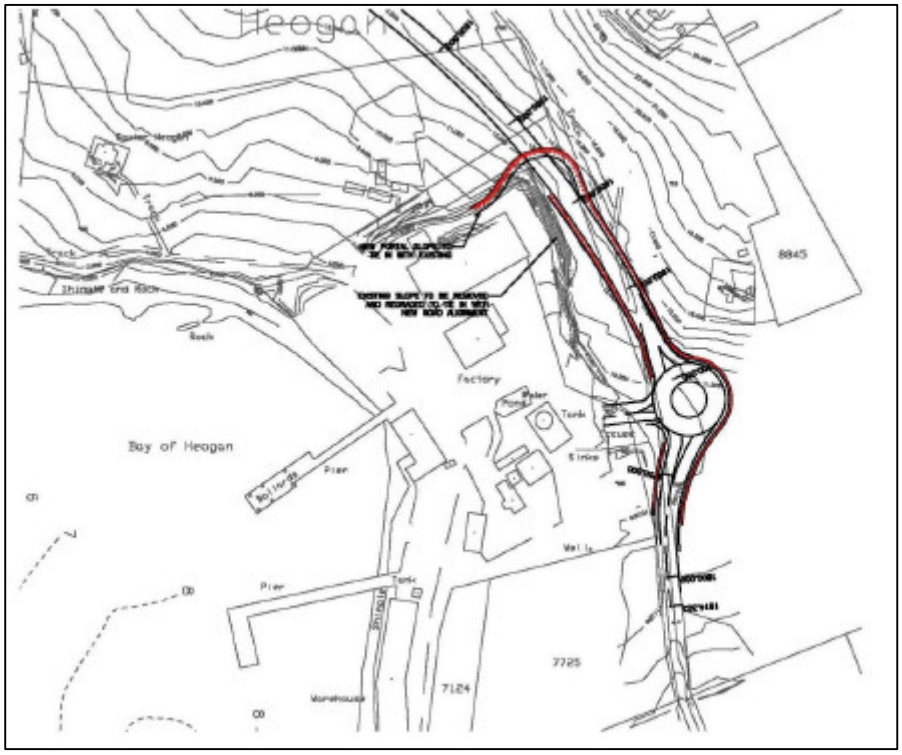


Figure 7.4: Tunnel Alignment showing Bressay Approach

Figure 7.5: Tunnel Alignment showing Bressay Approach (from Heogan Road)

Structures affected by the proposed tunnel alignment would be limited to a warehouse owned by LPA on the Lerwick side. On the Bressay side, the tunnel portal, cutting and new road have been designed such that the factory and cottage would remain unaffected[20].

7.3.3 Tunnel Construction and Support

The tunnel geometry is a simple 'D' shape, with an arched roof, straight vertical side walls and a flat invert. It has been developed in view of the anticipated constraints and has provision for two way traffic, a footpath / cycleway of 2m plus an additional carriage width of 1.05m which can be used as hard shoulder.

Preliminary assessment of rock mass indicated that tunnel support would include a primary lining comprising sprayed concrete and rock bolts with provision for a secondary lining (incorporating a waterproof membrane) over the sub-sea section only.

7.3.4 Costs and Programme

Preliminary cost estimates are in the order of £23.8m and £2.05m for ground investigation (inclusive of consultant supervision and interpretative report) and detailed design consultancy costs (which are inclusive of independent checking, procurement, construction supervision and all work necessary to secure consents during the statutory procedures).

Mobilisation and completing of the cuttings on the Lerwick and Bressay sides would take some two months each. Tunnelling is anticipated to take 12 months to complete with a further six months to complete final support, road construction and mechanical and electrical (M&E) fit out. Prior to commencing site work it is considered that a period of eight months would be required for ground

[20] ZetTrans have had preliminary discussions with LPA and the affected tenant and also with other parties who could be affected by the works (see Annex B)

investigation drilling and design. This gives an overall programme of some 22 months.

Table 7.1: Drill and Blast Tunnel Costs

Item	Costs Estimate (£)
Professional Fees	1,100,000
Investigations and Surveys	950,000
Land Acquisition	180,000
Accommodation Works	20,000
Construction Costs	23,809,000
Heogan Road Improvement Costs	200,000
Total	**£26,259,000**
Annual Operating Costs and Maintenance	£100,000

7.4 OPTION 2 - HIGH LEVEL BRIDGE

The STAG 1 Report identified that a high level fixed bridge would be taken forward to detailed appraisal in STAG Part 2.

7.4.1 Route Selection

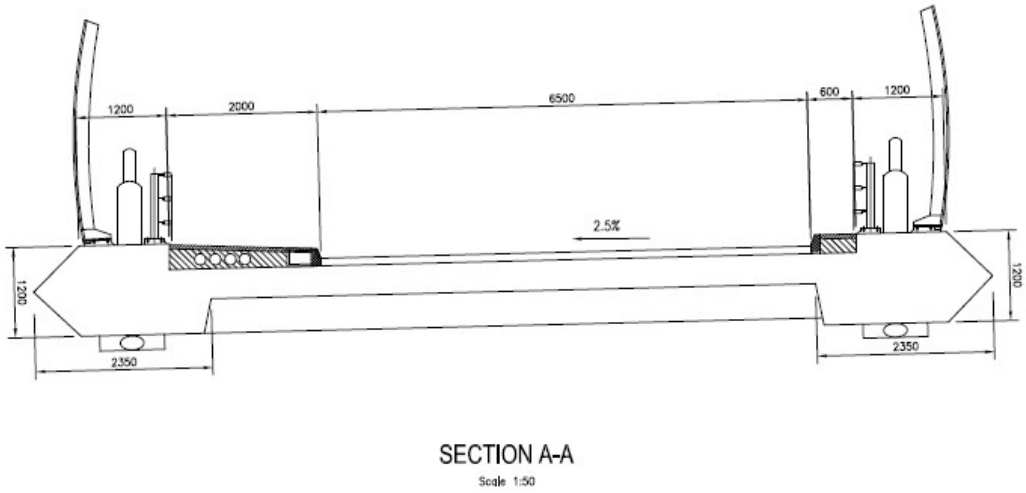
In the STAG 1 report the high level fixed bridge was taken as having an airdraft above Mean High Water Springs (MHWS) of at least 40m and a clear width between supports of at least 200m. The bridge crossing location was taken to be from Point of Scatland to Heogan on Bressay (see Figure 7.6 below).

Figure 7.6: Bridge Alignment showing Lerwick Approach

In appraising this option in STAG Part 2, further consultation has been undertaken with SIC's Roads Service and Planning Service together with LPA to establish the design parameters for the bridge.

The design speed has been taken as 80 kph and the maximum gradients taken as 8%. The bridge would carry a 6.5m wide two lane carriageway with a 2m combined footway/cycleway on one side and a 0.6m wide verge on the other. The bridge would also be provided with wind shielding. The proposed cross section of the bridge is shown on Figure 7.7

Figure 7.7: Proposed Cross Section of the Bridge



LPA advised on a range of vessels which could visit the harbour in the future and which have a significant air draft (see Appendix 7.1). An example would include the PLSV Seven Oceans (Length: 157.31m, Breadth: 28.4m, Design Draught: 7.5m (forward azimuths retracted), Air Draught: 47.8m (to top of crane with ramp down, 56m with ramp up in 90 degree) is shown below in Figure 7.8.

Figure 7.8: PLSV Seven Oceans

The navigation parameters for the bridge have therefore been taken as an airdraft of 60m above MHWS over a 260m wide channel.

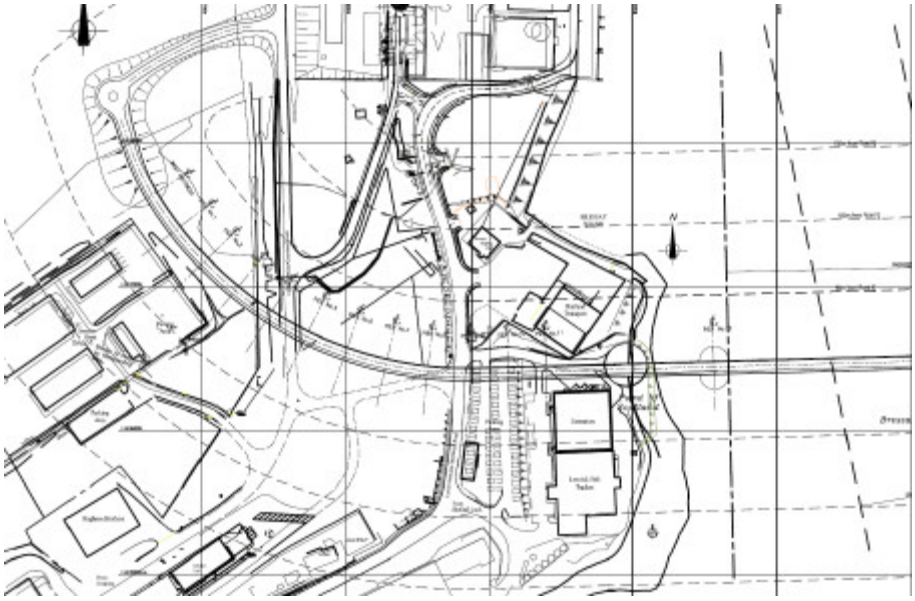
7.4.2 Proposed Link Road Alignment

Following further site and desk review the Point of Scatland location has been confirmed as the preferred location. Given the extent of existing and proposed development on the Lerwick side of the Sound the alignment of the bridge option has been taken as passing between the Shetland Transport Warehouse and the extended Lerwick Fish Traders (LFT) Factory[21] as shown in Annex H (Figure H1).

To provide an airdraft of 60m above MHWS with a span 260m wide, extensive approach ramps would be required on both sides of the Sound to bring the road back down to meet the existing landform and tie into the existing road network. The structure proposed effectively comprises three bridges, an approach structure on the Lerwick side of the Sound with 10 spans of 295m and one span of 26.5m giving an overall length of 321.5m, an approach structure on the Bressay side with identical spans and overall length, and the main bridge structure with a main span of 280m and back spans on each side of 117m giving an overall length of 514m. The overall length of the bridge structure is therefore 1157m. A cable stayed option has been considered as the most appropriate solution for the main bridge with the bridge deck being supported by steel cables emanating from the towers which extend to 120m above MHWS.

The Lerwick approach structure crosses over both the Lower Gremista and Upper Gremista Roads. Two piers would also be located in the site occupied by Lerwick Fish Traders. Above Lower Gremista Road the bridge structure would cross over land which is presently utilised for rough grazing as shown on the attached plan Figure 7.9.

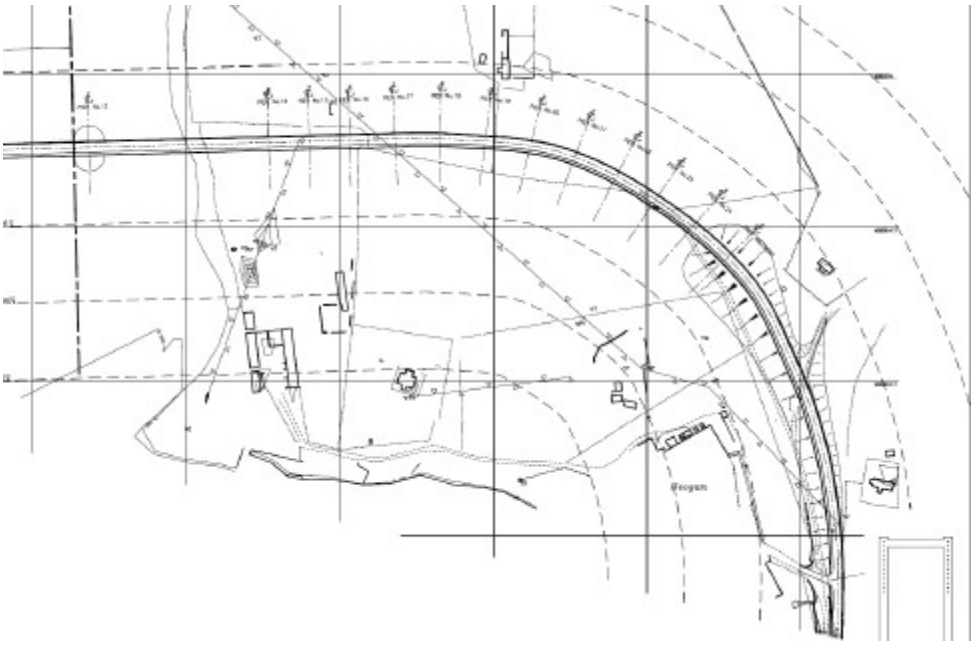
Figure 7.9: Bridge Alignment showing Details of Gremista Approach



The approach structure on the Bressay side crosses over open fields as shown on Figure 7.10.

[21] ZetTrans have had preliminary discussions with LPA and the affected tenant and also with other parties who could be affected by the works (see Annex B)

Figure 7.10: Bridge Alignment showing Details of Bressay Approach



7.4.3 Bridge Construction and Support

Extensive use would be made of pre-cast concrete in the construction of the bridge and it is envisaged that construction would take a period of 30 months with site works concentrated over a period of three summer seasons.

Figure 7.11: High Level Bridge Construction

7.4.4 Costs

Costs for a high level bridge option as described above are set out in the following table.

Table 7.2: High Level Bridge Costs

Item	Costs Estimate (£)
Professional Fees	2,200,000
Investigations and Surveys	150,000
Land Acquisition	350,000
Accommodation Works	500,000
Construction Costs	48,000,000
Heogan Road Improvement Costs	200,000
Total	**£51,400,000**
Annual Operating Costs and Maintenance	£100,000

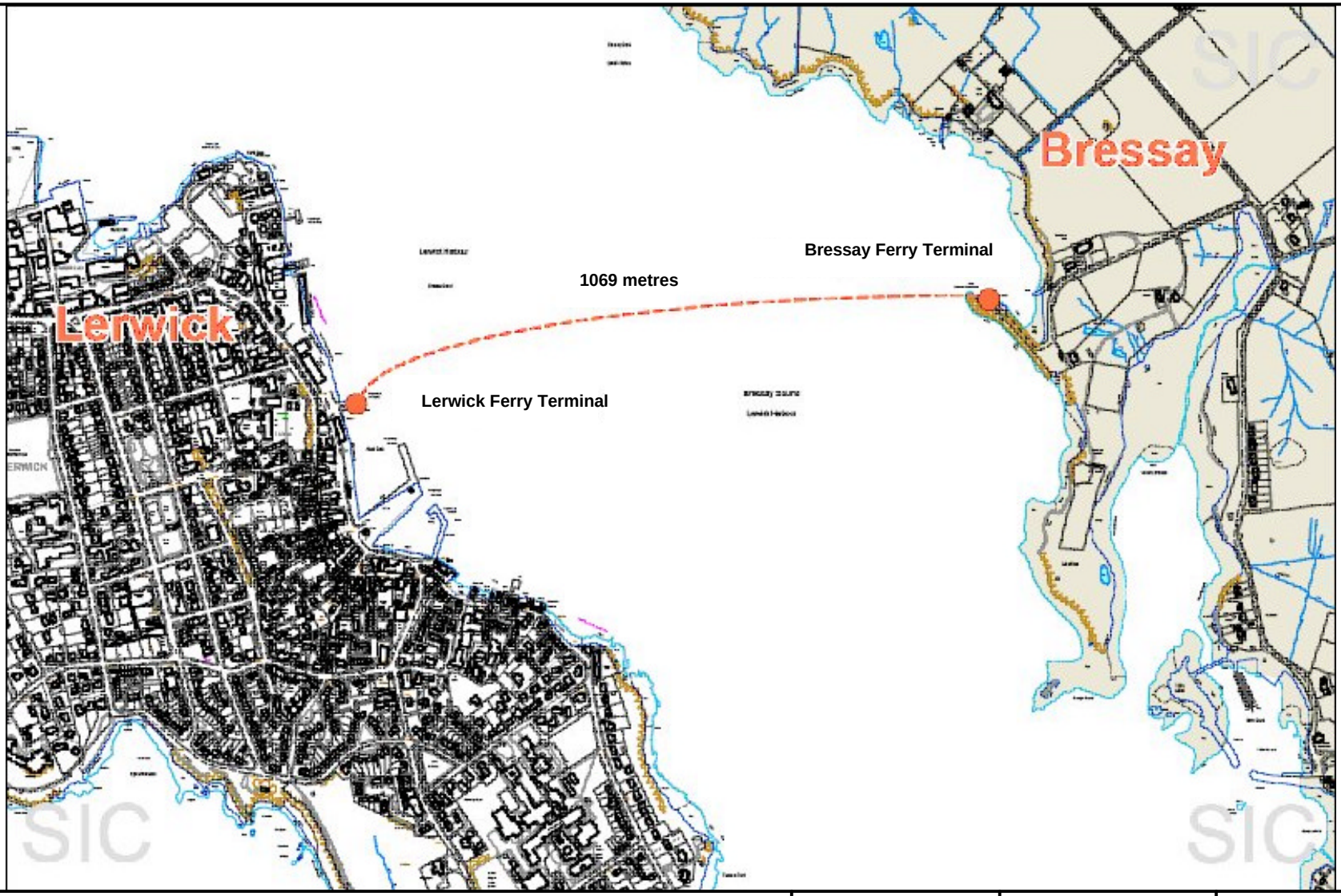
7.5 OPTION 3 - RECONFIGURED FERRY SERVICE (EXISTING VESSEL/RECONFIGURED FERRY)

7.5.1 Proposed Service

This option is an enhanced ferry service on the existing route (see Figure 7.12) using the existing ferry (see Figure 7.13).

Figure 7.13: The Leirna (the Current Ferry)

It would include a lengthened operational day and some increase in the frequency of sailings at certain times of day. The service would operate as follows in table 7.3:



Key

Existing Ferry Route

Not to Scale

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Figure 7.12: Existing Ferry Route

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Table 7.3: Reconfigured Ferry Service

	Current	Proposed
Morning	0700 depart Bressay	0545 depart Bressay
Sunday – Thursday	2300 depart Lerwick	2400 depart Lerwick
Friday and Saturday	0100 depart Lerwick	0145 depart Lerwick

In addition there would be an improvement in the Sunday morning service, returning to that of the service which was in operation prior to the introduction of the maintenance and drill period on a Sunday.

7.5.2 Consultations

The configurations and fare structure for this option have been developed in order to best meet the access and integration issues raised following the First Stage consultations (see Chapter 3). These include:

- the Bressay communities need to be able to have better transport integration with air travel for Sumburgh, i.e. to be able to travel on the first flights without the current overnight stay on Mainland Shetland;
- enabling people to better access shift work, both on an off the island by a lengthened day;
- the current limited service on Sundays, particularly mornings; and
- the high fare levels, particularly for Bressay residents, relative to Bressay's dependence on Mainland Shetland for opportunities.

If this option (reconfigured ferry service) was the preferred option, more work would be undertaken to finalise the details of operations.

The assumptions made for the purposes of costings and the associated worksheets are in Annex I.

7.5.3 Fare Levels

Current affordability of fares is a clear issue for the Bressay community (see Chapter 3). In particular this is because of their heavy reliance on Mainland Shetland for employment, services and leisure. Consultees stated a desire to use the transport link up to two or three times a day, but being unable to, because of the financial cost.

This study has therefore compared Option 3 on the basis of three fare levels as follows:

Fare Levels used on the Appraisal	
1	Retention of current fare structure
2	Removal of fares
3	A more sophisticated structure reflecting these issues raised which includes[22]: • monthly season tickets for Bressay residents (unlimited travel per month): o £100 for vehicle and driver (the driver could also use the ticket as a foot passenger) o £16 for adult passenger[23] • motorcycles and cycles: free; • plant vehicles the same cost as commercial vehicles; and • wider use of concessionary fares for Bressay residents, including: o pensioners (independent from vehicle costs), disabled, young o people (including those attending primary and secondary school); and o further/higher education and apprenticeships; and unemployed

7.5.4 Costs

The costs for this option, given the assumptions set out in Section 7.2 are:

Table 7.4: Reconfigured Ferry Service Costs

Item	**Vessel Costs (£)**	**Terminal Costs (£)**
Professional Fees	750,000	600,000
Investigations and Surveys	0	0
Land Acquisition	0	0
Accommodation Works	0	0
Construction Costs	6,000,000	5,400,000
Total Capital Costs	**6,750,000 (x3)**	**6,000,000 (berthing structure) + £500,000 (x3) (linkspan)**
Operating Costs and Maintenance (annual)	**1,427,841**	**19,000**
Income	367,477	
Net Service Costs	**1,060,364**	

7.6 OPTION 4 - DO MINIMUM: CURRENT FERRY SERVICE

This option makes the same assumptions as for Option 3, the reconfigured ferry. service (see Annex I).

7.6.1 Service and Fare Levels

The operational day and frequency of the ferry service would remain unchanged (for details see Section 12.3.1).

The fare levels would be informed by and determined by the current ferry fares review, but for the purposes of this study are assumed to increase with inflation (see Section 7.2).

[22] This would both inform and be informed by ZetTrans ongoing review of ferry fares
[23] More would need to be understood before assessing monthly travel tickets for those under 16

7.6.2 Costs

The costs for this option, given the assumptions set out in Section 7.2 are:

Table 7.5: Do Minimum: Current Ferry Service Costs

Item	Vessel Costs (£)	Terminal Costs (£)
Professional Fees	750,000	600,000
Investigations and Surveys	0	0
Land Acquisition	0	0
Accommodation Works	0	0
Construction Costs	6,000,000	5,400,000
Total Capital Costs	**6,750,000 (x3)**	**6,000,000 (berthing structure) + £500,000 (x3) (linkspan)**
Operating Costs and Maintenance (annual)	**1,301,862**	**19,000**
Income	367,477	
Net Service Costs	**934,385**	

7.7 ALTERNATIVE POWERED FERRIES

It has been suggested during the STAG process that new ferries could be powered by alternative fuels rather than the currently used fuel oil. Alternatives include electric ferries and hydrogen powered ferries. These newer technologies are still being developed and it is premature to decide now on the propulsion system that may be chosen for vessels that may not be built for several years. In the future, when new vessels are being specified, technologies may have advanced sufficiently to allow for other forms of propulsion to be more beneficial. There may also be benefits from lower emissions.

Electric ferries could be solar powered or driven from battery-stored electricity replenished from the mains when the vessel is alongside. The study has not identified any similar operations already powered in this way so cost comparisons are not possible at this stage. It is understood that all electric warships are being developed to be operational in 2012.

Hydrogen powered vessels are being developed. At present the only country which would allow hydrogen powered ferries is Norway. The Marine Coastguard Agency (MCA) do not currently allow this type of propulsion. However, it is understood that the storage of hydrogen as a fuel on vessels is safer than propane, for example, as hydrogen is lighter than air and any leakage should evaporate to atmosphere provided there is suitable ventilation. It is understood that hydrogen powered engines cost about half as much in fuel costs as equivalent fuel oil engines to run. However, they are more expensive to purchase as they are not yet in commercial production. In addition, prototype hydrogen powered vessels currently being built are being fitted with auxiliary diesel engines connected to the same propulsion units through combination gear boxes in case the hydrogen system fails. This adds to the capital costs of the vessel and utilises more space. If a costing of this type of propulsion is required for this appraisal it is recommended that vessel capital costs are increased by 33% and fuel costs reduced by 40% compared to conventional propulsion.

If a ferry option was the preferred option, consideration of alternative powered vessels should be made in the future.

7.8 PUBLIC TRANSPORT IMPROVEMENTS

The importance of the centre-to-centre link[24] and current issues for accessing the ferry terminal on Bressay, for some, (see Chapter 3) indicated at an early stage that public transport improvements would be required if issues of access and integration raised were to be fully addressed. Current levels of service are set out in Section 12.3.2.

In order to assess the level of public transport required, this study has made comparison of three sub-options (A, B and C) with increasing levels of service provision. These levels of provision have been assessed in relation to each of the Options 1-3.

Work has also been undertaken into the costs of running a water taxi/passenger service.

7.8.1 Public Transport Routes and Frequency of Service (Sub-Options A-C)

The following route is proposed for Options 1 and 2 (see Figure 7.14):

- depart from Lerwick Town Centre, passing through Gremista, the fixed link and Heogan, before taking the west road past Voeside and onto Ham. The route would then return via the east road past the hall and school, before returning to Lerwick (shown in blue, on the map);
- for each service, there would be an option to book ahead to be collected at Kirkabister, Noss and Beosetter and if on the bus, passengers would be able to be dropped off along these roads (shown in red on the map); and
- the option would be for a midibus, suitable for 30 passengers.

The following route is considered appropriate for Option 3 (see Figure 7.15):

- depart from Bressay ferry terminal, turning down Voeside and onto Ham. The route would then return via the east road past the hall and school, before returning to the terminal, where appropriate in time for the return ferry (shown in blue on the map);
- for each service, there would be an option to book ahead to be collected at Kirkabister, Noss and Beosetter and if on the bus, passengers would be able to be dropped off along these roads (shown in red on the map); and
- the option would be a 7-seater car, suitable for six passengers.

There are three sub-options which have been considered in terms of frequency of the provided service:

Sub-Option A: based on previous proposals:
- Weekdays and Saturdays: six return runs a day into Lerwick, four on a Saturday. This would include school runs.
- Service commences with a return bus arriving Lerwick for 8am, with an evening bus departing Lerwick.
- Without a Sunday service.

[24] This term is used in the report (and reflects feedback in consultations) to describe the current ferry service which runs from a relatively central area in Bressay to a location in the centre of Lerwick

Key

Fixed Timetable

On Demand

Bus Stops

Not to Scale

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Figure 7.14: Bus Routes Option 1 and 2

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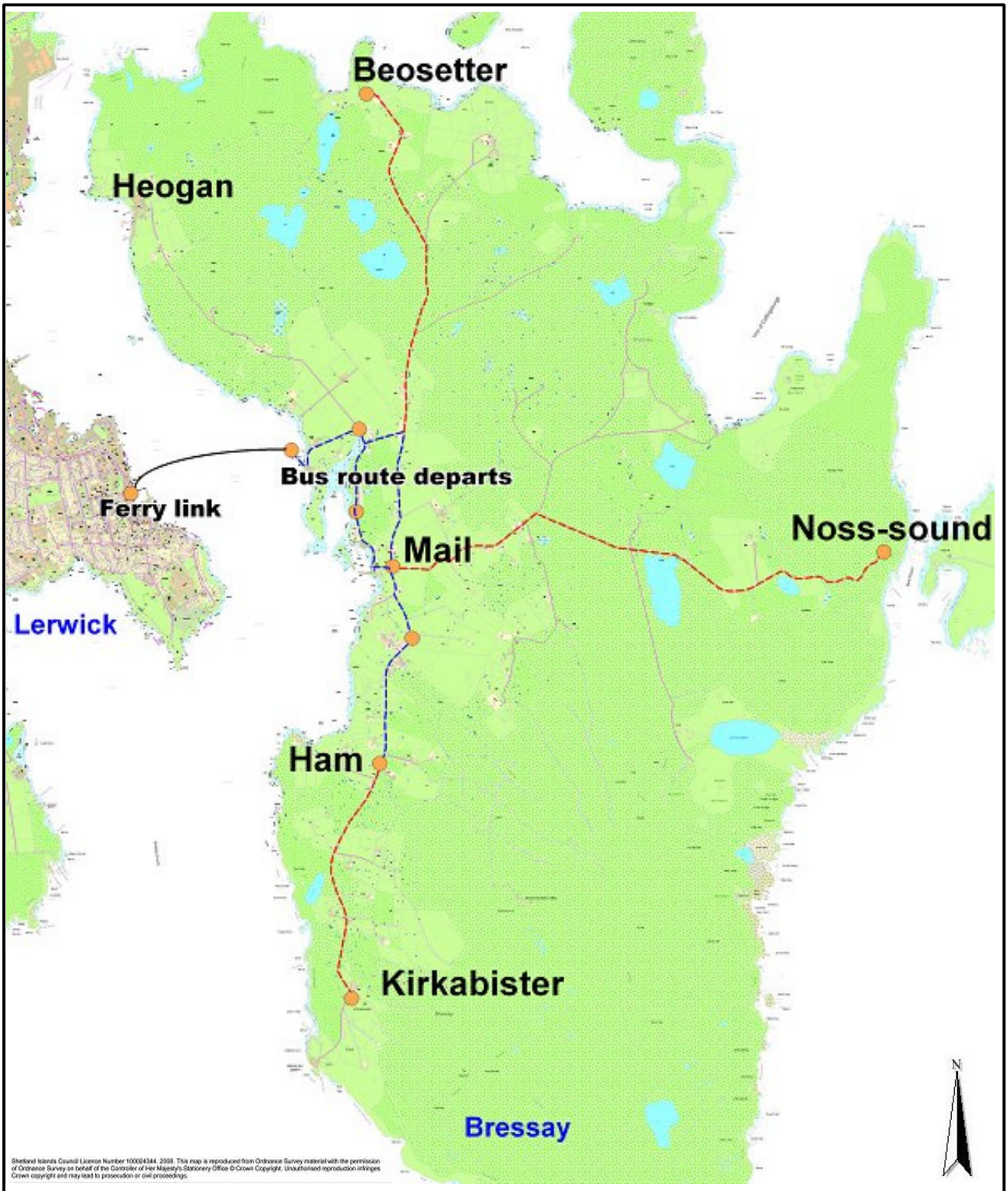

Key

Fixed Timetable

On Demand

Bus Stops

Not to Scale

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Figure 7.15: Bus Routes Option 3

Sub-Option B: based on current Scalloway timetable:

- Weekdays and Saturdays: 11 runs a day into Lerwick, 9 runs to Bressay.
- Service commences with a return bus arriving Lerwick for 8am, with a final bus departing Lerwick at 11pm.
- With or without a Sunday service.

Sub-Option C: similar to frequency of current ferry service:

- The first service of each day departs Bressay at 0700 hours, and departs Lerwick at 0715 hours, but consideration would be made of a service capable of arriving at the fish factory in time for the start of shift.
- 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 less crossings during the morning, compared to other days, to enable planned maintenance.

7.8.2 Alternative Public Transport Improvements (Sub-option D)

This sub-option is for a water taxi/small passenger ferry, running from the Mail Pier or the current pier on Bressay, to a location in Lerwick. It has been considered in STAG 2 as a possible method to maintain the centre-to-centre link, should a fixed link be constructed or to assist in increasing the levels of ferry service provided.

It would be configured as public transport Sub-options A to C described above, and/or available on demand, with a fare structure determined after costs are known.

7.8.3 Public Transport Costs

The assumptions made, for the purposes of costings and the worksheets used, are included in Annex J.

Table 7.6: Public Transport Costs

	Options 1 and 2 (Fixed Links)	**Option 3 (Reconfigured Ferry)**
Road Improvements (capital expenditure)	£50,000 for turning points.	N/A
Provision of Bus Shelters (capital expenditure)	£30,000	£30,000
Sub-Option A (revenue exp.)	£70,000/year	£35,000/ year
Sub-Option B (revenue exp.)	£95,000/ year	£47,500/ year
Sub-Option C (revenue exp.)	£200,000/ year	£100,000/year
Sub-Option D (capital and revenue exp.)	£367,500 capital costs and £384,893/ year	N/A

The study has identified the high costs of running a water taxi/passenger ferry (Sub-option D) compared to those of running a bus service, and therefore no further work was undertaken on this sub-option.

7.9 PROVISION FOR WALKING AND CYCLING

As part of any of the three options provision would be made to ensure for enabling and, where possible, improving people's ability to walk and cycle to access opportunities.

Appendix 7.1

Vessel Specifications

Appendix 7.1 Vessels Specifications

Table A7.1 Vessel Specifications

Vessel Type & Vessel Name	Function	Key Dimensions
PLSV 'Seven Oceans'	• Installation of rigid pipelines • Also has ability to perform a wide range of subsea construction tasks	**Length:** 157.31m **Breadth:** 28.4m **Design Draught:** 7.5m (forward azimuths retracted) **Air Draught (at light draft 5.8m):** 47.8m (to top of crane with ramp down, 56m with Ramp up in 90 degree)
Nordic Heavy Lift	• Crane vessel with 5,000 tonne lifting capacity	**Draft (operational):** 7.0 to 11.0m **Air Draught:** Mast height 82m*
Jumbo Javelin / Fairpartner Heavy Lift Transport Vessels	• Offshore industry - for higher lifting capability as well as larger outreach and lifting height for offshore installation	**Length:** 143.1m **Breadth:** 26.5m **Draft:** 6.5m **Air Draught:** 40m
Diving Support - Offshore Construction Vessel (YN-712) 'Toisa Pegasus'	• Diving Support Vessel	**Length:** 131.7m **Breadth:** 22.0m **Design Draught:** 6.25m **Scantling Draught:** 6.75m **Air Draught:** 46m*
Diving Support - Offshore Construction Vessel (YN-713) 'Seven Atlantic'	• Diving Support Vessel	**Length:** 144.79m **Breadth:** 26.0m **Design Draught:** 7.00m **Scantling Draught:** 8.00m **Air Draught:** 48m*
Well-intervention – Diving Support Vessel (YN-715) 'Well Enhancer'	• Diving Support Vessel	**Length:** 131.70m **Breadth:** 22.0m **Design Draught:** 6.25m **Scantling Draught:** 6.75m **Air Draught:** 47m*
Heavy Lift Vessel (YN-716) 'Oleg Strashnov'	• Heavy lifting vessel	**Length:** 183.0m **Breadth:** 47.0m **Design Draught:** 13.84m **Scantling Draught:** 14.00m **Air Draught:** 75m*
Heavy Construction Ship 'Skandi Acergy'	• Heavy Construction Ship	**Length:** 157m **Breadth:** 27.0m **Draft Maximum:** 8.5m **Normal Draft:** 5.8m **Air Draught:** Not Stated

* above indicates air drafts which are approximate and have been calculated based on profile drawings of the vessels from the building yards.