

Orkney Outer North Isles STAG Study

STAG Pre-Appraisal & Part 1 Reports

On behalf of **Orkney Islands Council**



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Summary

Orkney Islands Council, together with the Highlands and Islands Regional Transport Partnership (HITRANS), commissioned this study based on the Scottish Transport Appraisal Guidance (STAG) to investigate the future of air and ferry services to the Outer North Isles of the Orkney Archipelago. Whilst STAG is a holistic end-to-end process, this report forms the STAG Pre-Appraisal and Part 1 analysis, with a more detailed STAG Part 2 likely to follow in due course.

The islands classified as the Outer North Isles and considered in this study are:

- Eday;
- North Ronaldsay;
- Papa Westray;
- Sanday;
- Stronsay; and
- Westray.

The Outer North Isles are the most distant islands from the capital Kirkwall, an issue accentuated by the open and exposed seas and challenging tidal conditions separating these islands from the mainland.

Why Use STAG?

STAG is Transport Scotland's official appraisal guidance and all investment proposals seeking government sign-off or funding are required to comply with STAG.

STAG is an objective-led framework and is thus not driven by pre-determined solutions. It is based on an understanding of the transport problems, issues opportunities and constraints; public consultation; and evidence-based objective setting. This ensures that the ultimate option or options progressed address the transport needs of the communities in question.

Problems, Issues, Opportunities & Constraints

The identification of problems, issues, opportunities & constraints within the transport and land-use system form the starting point for any STAG study.

The principal 'problems' within the Outer North Isles transport network stem from a combination of challenging operational conditions; ageing assets; service frequency and capacity issues, and worsening demographics in a number of the island communities. Whilst the problems are significant, there are nonetheless important opportunities in terms of the potential role of eg Transport Scotland in supporting ferry services and technological developments in the air industry.

There do however remain a series of constraints in terms of improving connectivity to the Outer North Isles. These constraints include challenging sea conditions, restrictions on night flying and the requirement for infrastructure improvements to support larger ferries & aircraft amongst others.

Objective Setting

A conventional STAG approach would set Transport Planning Objectives, based on a set of identified problems and issues from the Pre-Appraisal. However in this case, Transport Scotland's 'Routes and Services Methodology' (RSM) has recently been applied (using a bespoke primary data collection exercise undertaken on the islands), and this has led to the specification of a 'model' level of ferry service provision for each island (in terms of the length of the operating day and the service frequency), designed to meet the needs of the islands based on the characteristics identified. The view was therefore taken that the RSM outcomes encapsulate, at a high level, the problems and issues often identified at the pre-appraisal stage.

However, as noted above, the RSM only considers ferry service provision, whilst the Outer North Isles are served **both by air & ferry services**, with air being the prominent mode of travel from both North Ronaldsay and Papa Westray, albeit offering very limited capacity. In light of the above, it was considered appropriate to redefine the RSM approach to consider the levels of connectivity based on the outcomes of the RSM by a **combination of ferry and air services**.

Whilst a prudent approach, it is also important to note that the RSM is primarily concerned with connectivity but a further key issue here is capacity. In common with other ferry services, the Outer North Isles ferries rarely have any issues with passenger capacity, although many of the more popular sailings reportedly depart with their vehicle deck at capacity. Passenger capacity on the air services is much more limited, with each aircraft having a capacity of eight compared to 142 or 190 per ferry.

With the accepted approach, it was noted that a number of flights across the week are capacity constrained due to the regular carrying of school children, teachers, health workers, bank staff etc. It is therefore worth defining '**effective connectivity**' as being the number of connections which are not currently constrained in this way. These 'effective connections' would become the benchmark for measuring connectivity, ie the capacity constrained flights would be excluded. Any connectivity solution must therefore provide sufficient capacity for passengers, cars and goods.

Any STAG Part 1 study is also concerned with the STAG criteria:

- Environment;
- Economy;
- Accessibility and Social Inclusion;
- Safety;
- Integration;

in addition to:

- Established Policy Directives; and
- Feasibility, Affordability; and Public Acceptability.

Option Development

The study considered options for improvement in both the short-term (ie within the current operational resources) and the medium to long-term (ie improvements that require new / additional vessels, aircraft, infrastructure etc).

Short-Term Options

A series of short-term options for improvement to the current Outer North Isles transport network were considered. The key point of note is that the current air and ferry service is operating at or near its operational maximum, certainly as far as the peak times of the day are concerned. Therefore, with the exception of adding additional crew, any change in the service pattern is at best a zero sum game in terms of the number of services offered.

Four short-term options were deemed worthy of further consideration:

- **Option ST7:** Increase the overall level of service to Eday so as to ensure it is comparable with the other islands.
- **Option ST8:** Facilitate a three night weekend for school children resident in the islands by offering a Monday morning ferry or flight from each island to Kirkwall – dependent on appetite of all Kirkwall Grammar School parents & pupils.
- **Option ST9:** Develop an integrated air and ferries fares policy which supports demand management.
- **Option ST10:** Stagger the vessel operating day start times to achieve a longer operating day.

Long-Term Options

In line with STAG, the optioneering process for longer-term initiatives was unconstrained, testing all potential options in a qualitative sense against the objectives. Only options which clearly did not contribute to the objectives were removed from further consideration (ie there was a clear rationale for sifting them out).

The '**Do Nothing**' option is therefore not acceptable as the current ferries will be life expired in the near future and will eventually become uneconomic to continue to run. A '**Do Minimum**' option of replacing all of the aircraft and ferries on a like for like basis is also not acceptable as there will be only marginal impacts, if any, on connectivity / capacity / operating day.

A series of options surrounding vessels, harbour infrastructure, aircraft, airfields and fixed links were recommended to be taken forward to further public consultation within the context of a STAG Part 2 appraisal.

Next Steps

The work to date broadly represents a STAG Pre-Appraisal and Part 1 Appraisal. The end point of a Part 1 Appraisal is a set of options to take forward to more detailed analysis in a Part 2 Appraisal. The logical step to progress the study would be to undertake a STAG Part 2 Appraisal based on the options emerging above. A Part 2 Appraisal comprises a much more detailed analysis of the options (combining them into packages) in terms of their benefits, costs and impacts, as encapsulated by the Planning Objectives and the STAG criteria.

In this case, the key outcomes from a STAG Part 2 study would be:

- An **agreed medium term solution** for meeting the connectivity needs of the Outer North Isles, in terms of the mix of ferry and air services, and fixed links, based on an objective led analysis and comprehensive consultation with the communities concerned; and
- A timed **Route Map** to achieving this solution including key milestones in planning and procurement.

1 Introduction

1.1 Overview

- 1.1.1 Orkney Islands Council, together with the Highlands and Islands Transport Partnership (HITRANS), commissioned SYSTRA and their partners Peter Brett Associates LLP, The Maritime Group International Limited (TMG) and Northpoint Aviation to investigate future air and ferry service provision to the Outer North Isles of the Orkney Archipelago.
- 1.1.2 The islands classified as the Outer North Isles and included in this study are:
- Eday;
 - North Ronaldsay;
 - Papa Westray;
 - Sanday;
 - Stronsay; and
 - Westray.
- 1.1.3 The Outer North Isles are the most distant islands from the capital Kirkwall, an issue accentuated by the open and exposed seas and challenging tidal conditions separating these islands from the mainland.
- 1.1.4 A map of the Orkney archipelago, showing the Outer North Isles in the context of their wider geography, is provided below:

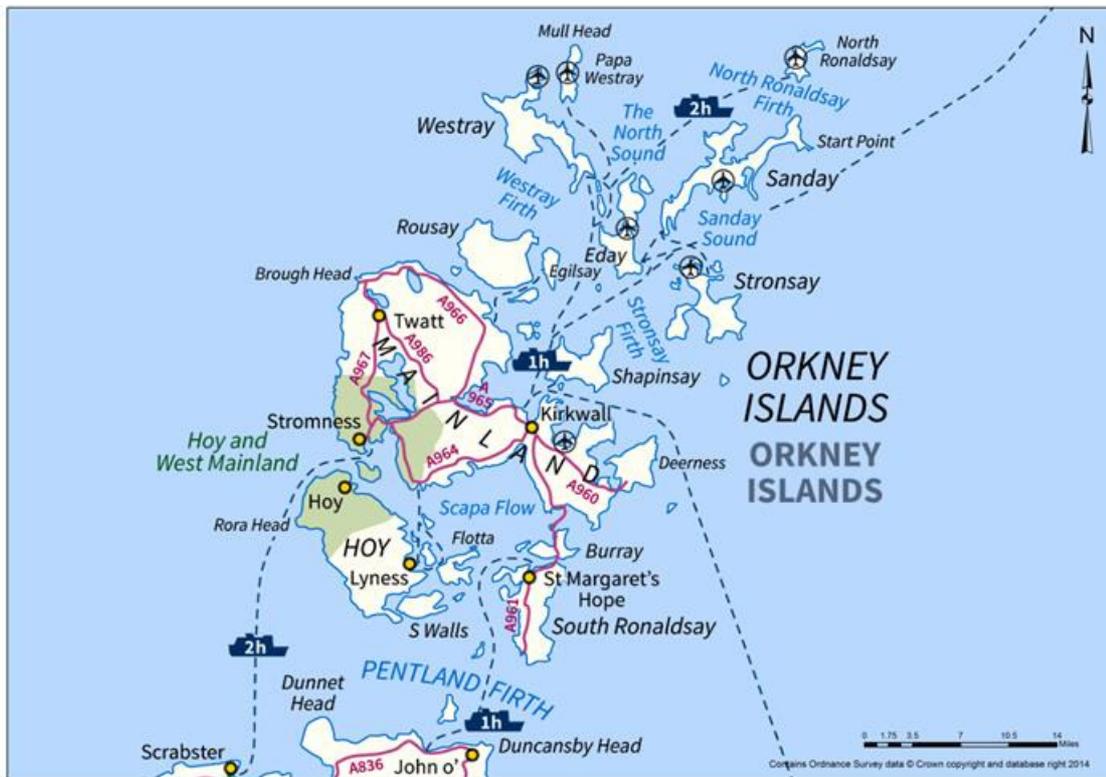


Figure 1.1: Orkney Archipelago

1.1.5 This study is driven by a combination of:

- the economic challenges facing the Outer North Isles;
- the need to formulate a strategic plan and investment programme to supplement and replace infrastructure which is gradually becoming life expired; and
- the need to establish the overall transportation requirements for lifeline services to these islands in terms of the combination of air and ferry services and fixed links.

1.1.6 The ultimate output of this study is the development of both short-term options (ie immediate) for the improvement of transport services to the Isles and the identification of longer-term options for future transport provision which balances the needs of the islands with the financial realities faced by the public sector. This will take the form of a Scottish Transport Appraisal Guidance (STAG) Pre-Appraisal and Part 1 Appraisal. The output of this study will be the recommendation of one or more options to be taken forward to a more detailed STAG Part 2 Appraisal.

2 Network & Island Socio-Economic Profiles

2.1 Overview & Baseline Report

- 2.1.1 In advance of discussing the problems, issues, opportunities and constraints, it is worth providing a very brief profile of the air and ferries network and each of the individual islands. Taken together, the air and ferry services provide core lifeline services to these islands, connecting them to the Orkney Mainland and onwards to the Scottish mainland and beyond.
- 2.1.2 In preparing for the pre-appraisal stage, we developed an extensive Baseline Report detailing the infrastructure and current air and ferry services to the Outer North Isles. The Baseline Report is included as an addendum to this report and provides both a detailed review of the network and forms the basis of the option appraisal detailed in this report. Key headlines from the Baseline Report are summarised in this report.
- 2.1.3 This report is also developed within the context of the wider review of ferry infrastructure provision with Transport Scotland through the application of Routes & Services Methodology (RSM)

2.2 Outer North Isles Network – Ferry Services

Orkney Ferries

- 2.2.1 Orkney Ferries Limited (OFL) is the operating company for all internal ferry services in Orkney and is wholly owned by Orkney Islands Council. OFL serves fifteen routes using nine vessels.
- 2.2.2 The Outer North Isles route network (and connections to the Scottish mainland) is shown in the map below.

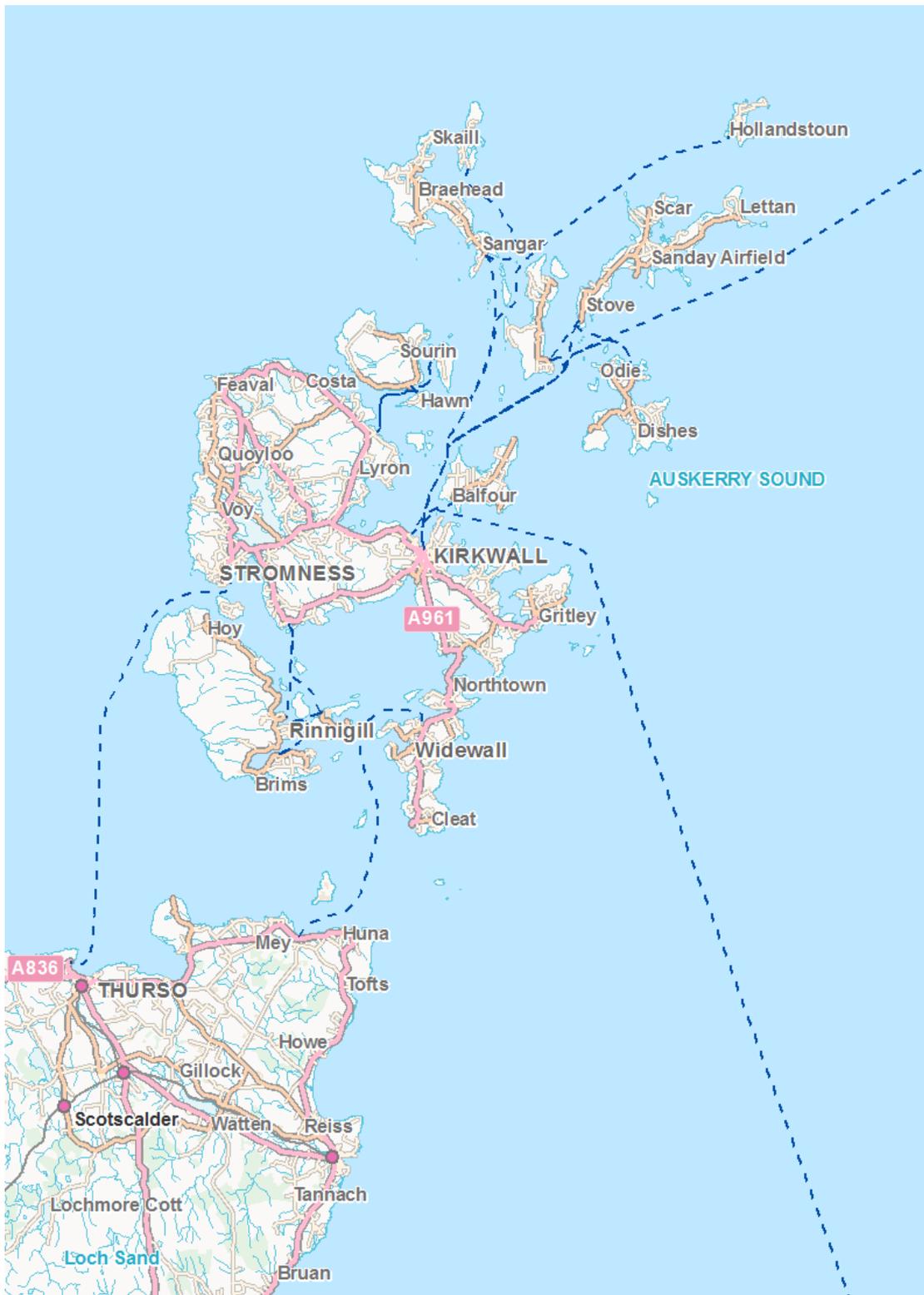


Figure 2.1: Orkney Ferries Network

2.2.3 The crossings to the Outer North Isles are relatively long and exposed to challenging wind and sea conditions. This is particularly the case with North Ronaldsay, which is the most outlying of the islands.

Vessels

- 2.2.4 The Outer North Isles are predominantly served by three vessels, the MV *Earl Sigurd*, MV *Earl Thorfinn* and the MV *Varagen*. A profile of each vessel is provided below (note commentary on both 'Earls' is provided after the MV *Earl Thorfinn* profile as the vessels are classmates).

MV *Earl Sigurd*

- 2.2.5 The following provides an overview of the key characteristics of the MV *Earl Sigurd*:

Type: Ro-Ro Vehicle and Passenger Ferry
Built: 1989 @ McTay Ltd., England
Flag: United Kingdom
Official No: 719643
IMO: 8902711
MMSI: 232000670
Call Sign: MLKN9
Port of Registry: Kirkwall
Passenger Certificate: MCA Class IIA/III
Gross Tonnage: 771
Main Engines: 2 x Mirrlees @ 743kW each
Number of propellers: 2
Type of propellers: Controllable Pitch
Rudder(s) including type: 2 x Ulstien
Bow Thruster(s): Yes
Stern Thruster s): No
Speed: 12 knots
Length: 45.0m
Beam: 11m
Draft: 3.252m
Doors: Bow and stern with bow visor
Capacity: 91/190 passengers; 22 cars or approximately 80 to 100 tonnes



MV *Earl Thorfinn*

- 2.2.6 The key characteristics of the Earl Thorfinn are provided below:

Type: Ro-Ro Vehicle and Passenger Ferry
Built: 1990 @ McTay Ltd., England
Official No: 719644
IMO: 8902723
MMSI: 232000760
Port of Registry: Kirkwall
Call-Sign: MLKP9
Passenger Certificate: MCA Class IIA/III
Gross Tonnage: 771
Main Engines: 2 x Mirrlees @ 743kW each
Number of propellers: 2
Type pf propellers: Controllable pitch
Rudder(s) including type: 2 x Ulstien
Bow Thruster(s): Yes
Stern Thruster s): No
Speed: 12 knots
Length: 45.0m
Beam: 11m
Draft: 3.252m
Doors: Bow and stern with bow visor
Capacity: 91/190 passengers; 22 cars or approximately 80 to 100 tonnes



- 2.2.7 The 'Earls', as the above two vessels are affectionately known, are sister ships which were specifically designed to serve the Outer North Isles roster. Their most distinguishing feature is the large lifting derrick affixed to the upper superstructure. The derrick is required for the

undertaking of Lo-Lo activities at North Ronaldsay and Papa Westray. The Earls share the roster for these two islands and support the MV *Varagen* on other routes.

MV *Varagen*

2.2.8 The key technical characteristics of the MV *Varagen* are set out below:

Type: Ro-Ro Vehicle and Passenger Ferry
Built: 1988 @ Cochrane Shipbuilders Ltd., England
Official No: 710153
IMO: 8818154
MMSI: 232000550
Port of Registry: Kirkwall
Call-Sign: MHBM9
Passenger Certificate: MCA Class IIA/III
Gross Tonnage: 928
Main Engines: 2 x Caterpillars @ 790kW each
Number of propellers: 2
Type of propellers: Controllable pitch
Rudder(s) including type: 2 x Becker
Bow Thruster(s): Yes
Stern Thruster(s): No
Speed: 15 knots
Length: 50.0m
Beam: 11m
Draft: 3.006m
Doors: Bow and stern with bow visor
Capacity: 142 passengers; 28 cars or approximately 120 tonnes



2.2.9 The MV *Varagen* was initially built to serve the short sea crossing between Burwick and John O'Groats. However, a variety of operational issues meant that she was reassigned to the Outer North Isles early in her career – this was much to the benefit of the islands as the MV *Varagen* became the largest and fastest vessel in the Orkney Ferries fleet. However, she does not have a lifting derrick and thus cannot be deployed to the North Ronaldsay or Papa Westray rosters.

Ports & Harbours

2.2.10 Specific consideration of the existing port and harbour infrastructure in each island is provided later in this document. However, it is worth noting at this stage that all of the harbours are owned and operated by Orkney Islands Council Marine Services. Whilst Kirkwall, Eday, Sanday, Stronsay and Westray are full Ro-Ro, North Ronaldsay and Papa Westray are Lo-Lo only.

2.3 Outer North Isles Network – Air Services

Loganair

2.3.1 Loganair operates scheduled inter-island air services to all of the Outer North Isles on the basis of a Public Service Obligation with Orkney Islands Council. The contract specifies the level of service for each island as well as the summer and winter timetable.

2.3.2 A map of the network is shown below.

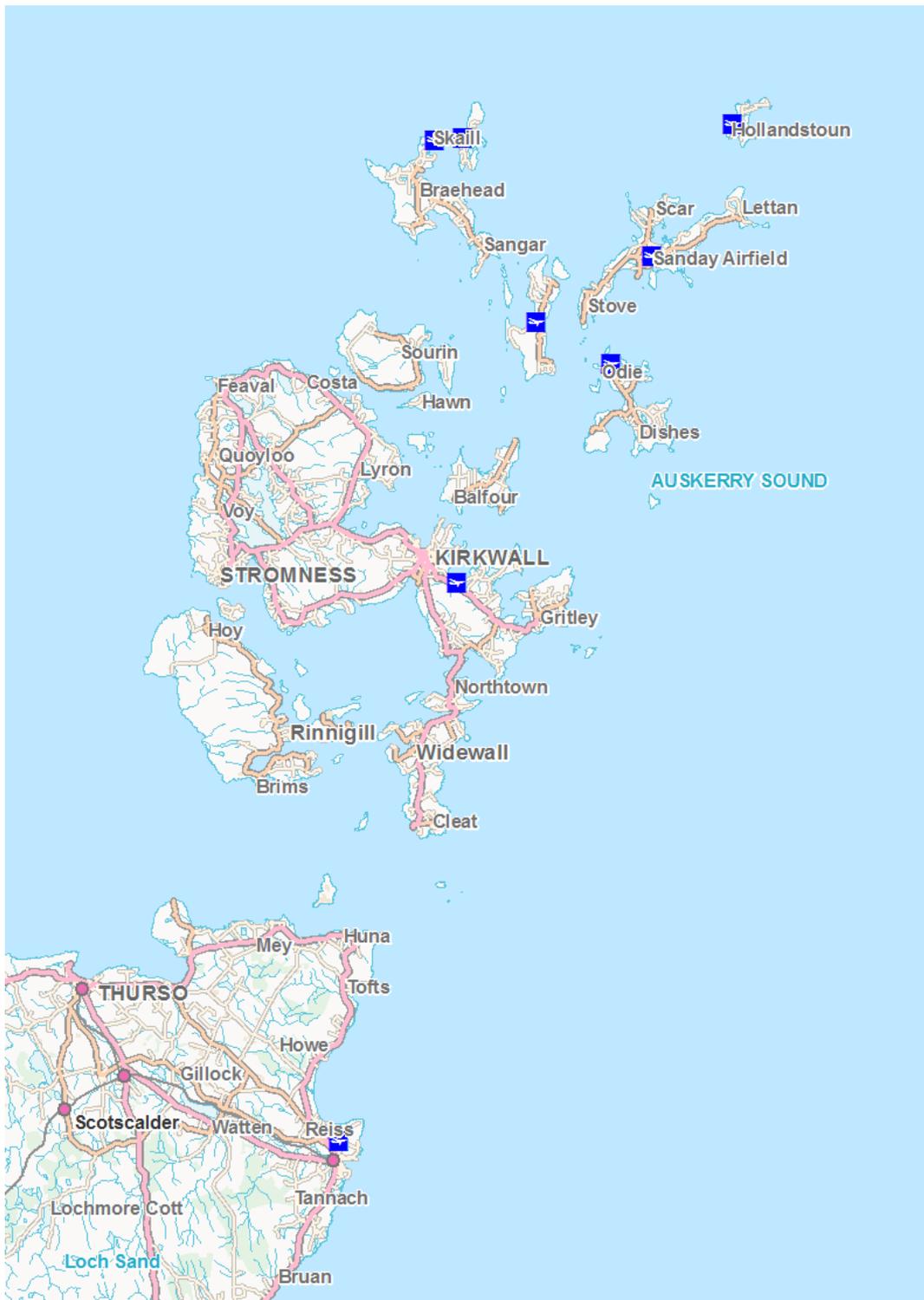


Figure 2.2: Outer North Isles Airfields

Aircraft

2.3.3 The routes to the Outer North Isles are served by two Britten-Norman Islander aircraft. The aircraft are operated by a single pilot and have a capacity of eight passengers, occasionally nine if weight restrictions permit. The aircraft maintenance requirement means that the

network is operated by two aircraft during the winter and one aircraft during the summer (this is explained in more detail later in this report).

2.3.4 There is a small cargo bay in the rear of the plane to accommodate luggage, parcels etc. The internal fittings of the aircraft can also be stripped out for bespoke cargo flights. Some key statistics are provided below:

- **Crew:** 1, although this can be increased to 2 as there are two control columns in the cockpit
- **Capacity:** typically 8, but up to 9 passengers
- **Maximum speed:** 170 mph (147 knots)
- **Range:** 874 miles
- **Service Ceiling:** 13,200 feet



Airfields

2.3.5 The airfields on the islands are owned and operated by Orkney Islands Council and offer a combination of grass and graded hardcore surfaces. None of the islands have instrument based approach systems and only North Ronaldsay currently has runway lighting. Specific details of each airfield can be found in the baselining report and the airfield-related operational issues are covered in Chapter 3.

2.4 Current Travel Volumes to / from the Outer North Isles

2.4.1 The table below shows the total travel volumes to / from each island to Kirkwall during the 2013-14 financial year.

Table 2.1 Outer North Isles Travel Volumes (2013-14)

to / from Island	Ferry - Passengers (% total pass)	Ferry - Cars	Ferry - CVs / freight (tonnes)	Air Passengers (% total pass)	Total Passengers
Eday	9,592 (96%)	2,025	1,524	379 (4%)	9,971
North Ronaldsay	529 (7%)	0	768	7,086 (93%)	7,615
Papa Westray	372 (8%)	0	743	4,370 (92%)	4,742
Sanday	28,640 (92%)	6,379	4,667	2,582 (8%)	31,222
Stronsay	17,407 (86%)	2,859	2,942	2,871 (14%)	20,278
Westray	39,409 (94%)	8,004	4,530	2,705 (6%)	42,114

2.4.2 The main points to emerge from this are:

- the large majority of passengers (86%-96%) from the four islands closer to Kirkwall (Eday, Sanday, Stronsay, Westray) travel by **ferry** (largely because these islands are comparatively well-served by ferries);
- the large majority of passengers (92%-93%) from the two islands further from Kirkwall (Papa Westray and North Ronaldsay) travel by **air** (again, largely because these two islands are principally served by air);
- there is a high ratio of passengers to cars, so many passengers travel as foot passengers
- demand is highly seasonal – 40% of all passengers travel between June and August (inclusive);
- across the six islands demand in July is more than three times greater than in January / February (although it should be acknowledged that refit periods are generally in January / February, which can in itself reduce the propensity to travel); and
- in addition to passenger demand, Loganair also carries various air freight.

2.5 Island Socio-Economic Profile

Demographics

2.5.1 An important consideration in understanding the travel needs of the Outer North Isles is analysing the trends in population and demography as these will influence travel behaviour going forward.

Population

2.5.2 The table below sets out the population, number of households and second home ownership as recorded in the 2011 Census for each of the six Outer North Isles.

Table 2.2: Orkney Outer North Isles – Population, Households and % Second Home Ownership

Island	Population	Household	% Second Home
Eday	160	100	12%
North Ronaldsay	72	51	20%
Papa Westray	90	50	20%
Sanday	494	282	10%
Stronsay	353	190	10%
Westray	588	324	8%

2.5.3 Westray has the largest population of the six islands with the two most distant islands, North Ronaldsay and Papa Westray, having the smallest population.

2.5.4 Interestingly, the Outer North Isles have a relatively high level of second home ownership, up to a fifth of households on North Ronaldsay and Papa Westray. If these are genuine tourist second homes (as opposed to second properties for on-islanders), they may generate a reasonably large number of trips in proportional terms.

Population Change

2.5.5 As well as the absolute level of population, it is also important to consider the trend change in population over time. Small islands are highly susceptible to small changes in the total population as a declining base can undermine key services.

2.5.6 Unfortunately, the trend change in population is only reported at the datazone level which, for the Outer North Isles, groups North Ronaldsay, Sanday & Stronsay and Papa Westray, Westray & Eday.

2.5.7 The figure below shows the trend and absolute population change for the North Ronaldsay, Sanday and Stronsay as well as the Orcadian and Scottish averages from 2001-11.

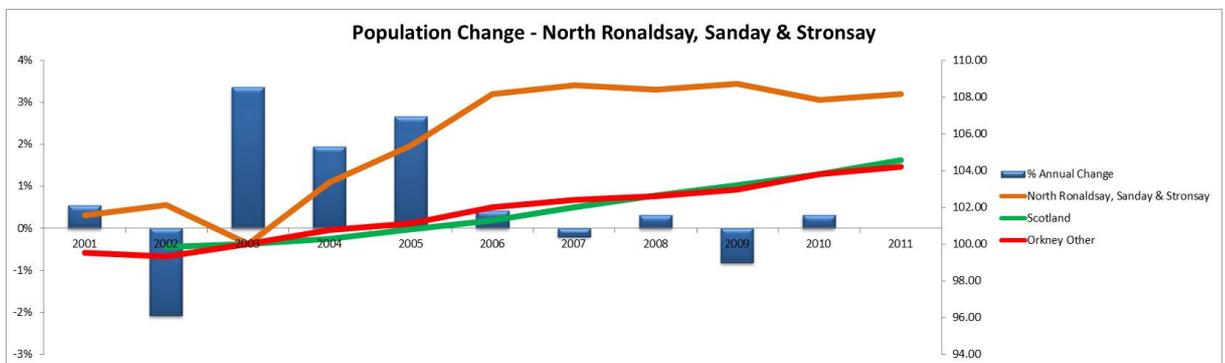


Figure 2.3: Population Change – North Ronaldsay, Sanday & Stronsay

2.5.8 The figure shows strong cumulative growth in population for this island group between 2001 and 2005, with relative flat-lining between 2006 and 2011. The pace of population growth for this subset of islands has comfortably outstripped the Orcadian average (which excludes these islands) and the Scottish.

2.5.9 The comparable figure for Westray, Papa Westray and Eday is shown below:

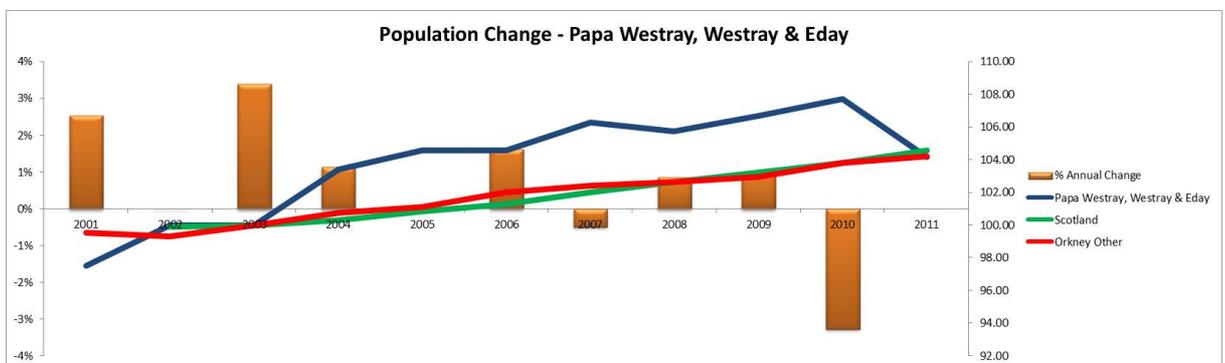


Figure 2.4: Population Change – Papa Westray, Westray & Eday

2.5.10 The cumulative population growth across this island grouping comfortably outstripped the Orcadian and Scottish averages between 2003 and 2010 but a significant reduction in population in 2011 led to an overall trend growth equivalent to the wider averages between 2001-2011.

Age Profile

2.5.11 The figure below shows the age profile of the Outer North Isles compared to the Orcadian (excluding the Outer North Isles) and Scottish averages.

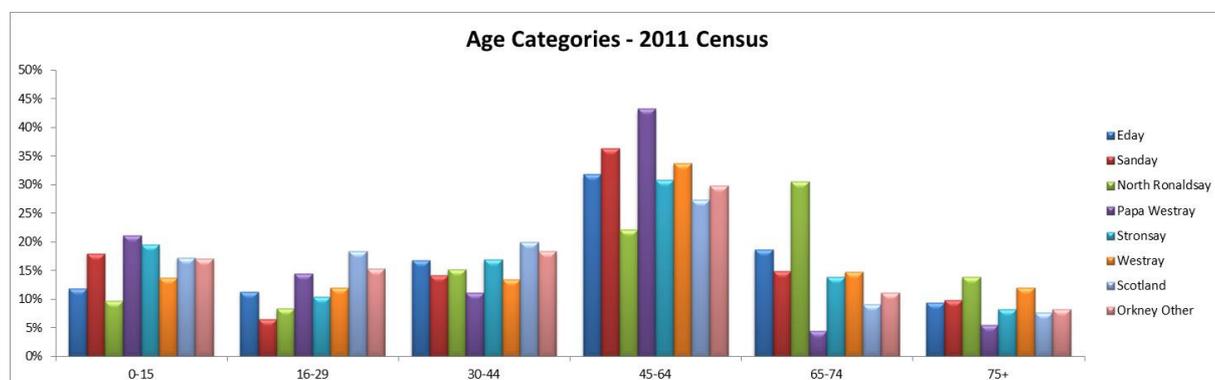


Figure 2.5: Age Categories – 2011 Census

2.5.12 As a general rule, the age structure of the Outer North Isles tends to be skewed more towards an ageing population than the Scottish and Orcadian averages.

2.5.13 North Ronaldsay has particularly unfavourable demographics, with 45% of its population of 72 above the national retirement age. Westray also has a relatively ageing population, with a higher proportion of residents in the 45-64, 65-74 and 75+ age brackets than the Scottish or Orcadian averages. This may reflect the distance of these islands from the mainland and the need for younger members of the native population to leave the island for work, returning at or near to retirement.

2.5.14 This trend is, however, checked by Papa Westray, which has more favourable demographics than all other islands, as well as the Orcadian and Scottish averages.

2.5.15 The other Outer North Isles have a demographic profile broadly equivalent to the Orcadian and Scottish averages, although there is generally a lower proportion of 16-29 year olds compared to the Scottish and Orcadian averages across the Outer North Isles.

Economic Activity

2.5.16 The economic activity rate is a key indicator of economic wellbeing. Islands with a high economic activity rate (ie people in or looking for work) tend to demonstrate better economic performance and a lower dependency ratio (ie the ratio of economically active to inactive residents).

2.5.17 The figure below shows the economic activity rate for the six Outer North Isles compared to the Orcadian (excluding the Outer North Isles) and Scottish averages.

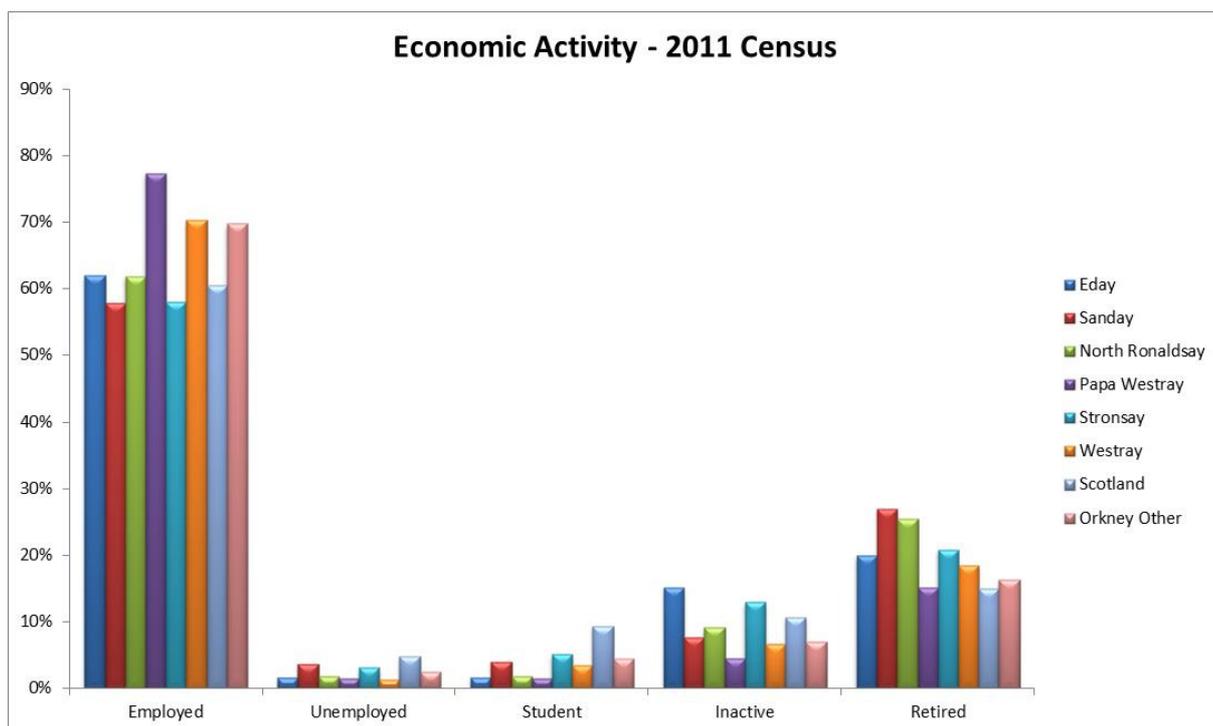


Figure 2.6: Economic Activity – 2011 Census

- 2.5.18 The economic activity rate is defined by those who are employed or unemployed and seeking work. The above figure shows that the Outer North Isles perform relatively favourably when compared to the Scottish average (a common trend amongst islands). However, with the exception of Papa Westray and Westray, the islands trail the wider Orkney average.
- 2.5.19 Papa Westray's rate of economic activity, combined with its favourable demographics, suggest that the island is well placed for the future.
- 2.5.20 As is common in islands, unemployment is very low and in all cases is lower than the Scottish average. Conversely, however, all of the islands, and indeed Orkney as a whole, has a lower concentration of students, principally because many young people will leave the islands to go to university or college.
- 2.5.21 A number of islands including Eday and Stronsay have a higher proportion of inactive people (working age people who choose to opt out of the labour market) than the Orcadian and Scottish averages. However, it is important not to underestimate the extent of the informal economy on islands, where economically inactive people often assist in cottage industries, agriculture and home based businesses.
- 2.5.22 It is perhaps unsurprising given the demographic profile set out above that the Outer North Isles generally have a higher proportion of retired residents than the Orcadian and Scottish averages. Sanday and North Ronaldsay in particular have a high level of retired residents, suggesting a relatively high dependency ratio. This is a key issue in terms of island sustainability in the long-term, but also the cost of delivering key transport services as the cost of fulfilling concessionary travel obligations increases.

Industrial Structure

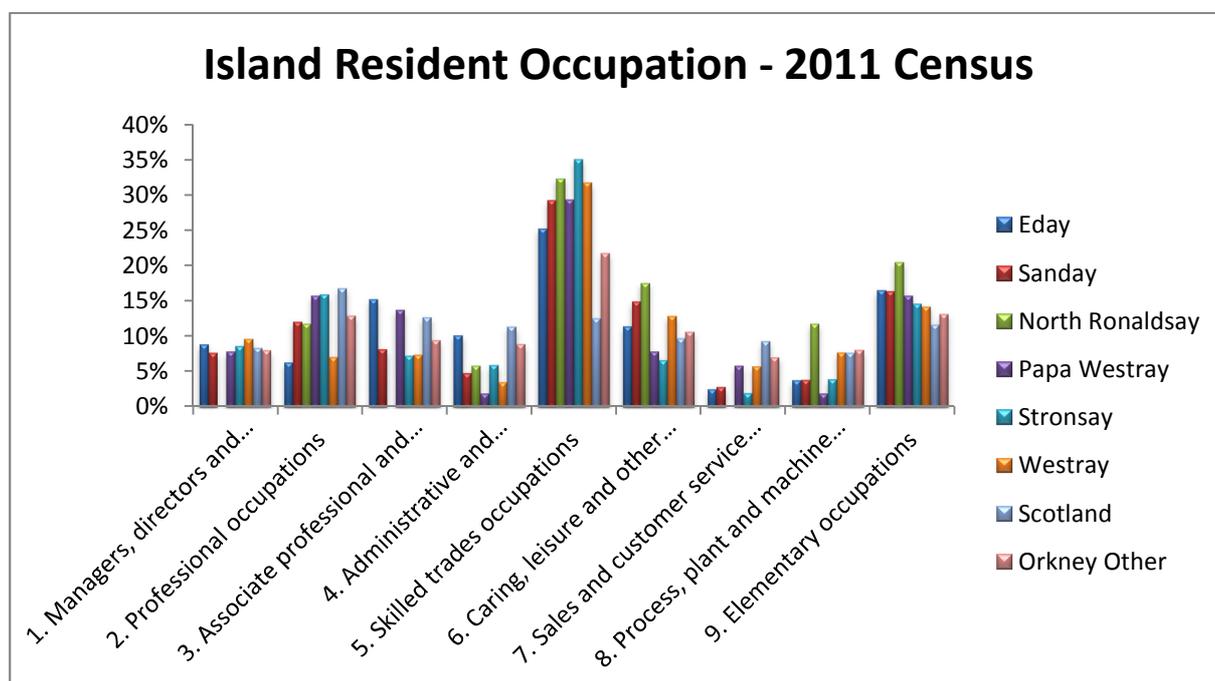


Figure 2.7: Island Resident Occupation

2.5.23 The two key points of note from the above chart are the fact that the Outer North Isles have a higher concentration of resident employment in 'Skilled Trade Occupations' and 'Elementary Occupations' than the Scottish and Orcadian averages. This is likely due to the high concentration of agricultural and small scale manufacturing jobs on these islands.

2.5.24 The Outer North Isles have a smaller concentration of employment in the public and service sectors.

Household Income

2.5.25 Median weekly household income is available from 2008/09 which suggests that income in the Papa Westray, Westray and Eday grouping is broadly consistent with the Scottish and Orcadian averages at £391 per week. However, the North Ronaldsay, Stronsay and Sanday grouping lags this average by around £25 per week at £365.

3 Pre-Appraisal

3.1 Overview

- 3.1.1 The purpose of this stage of a STAG study is to identify the problems, issues, opportunities and constraints within the **current** transport system. Addressing the identified problems and realising the opportunities (whilst acknowledging issues and constraints) is the ultimate aim of the STAG process, as reflected in the Transport Planning Objectives, STAG criteria and option scoring.
- 3.1.2 This chapter sets out the findings of the pre-appraisal for the Orkney Outer North Isles, identifying the basis for objective setting and subsequent option development and testing.

3.2 Problems

- 3.2.1 The problems, issues, opportunities and constraints facing the Outer North Isles are both network wide and island specific. We have therefore reported on this basis in this chapter.

Network-Wide

Connectivity

- 3.2.2 This section considers the connectivity of the six Outer North Isles to Kirkwall. **To provide some context at the outset, ferry passengers account for 83% of all passenger movements, with air services carrying 17%. However, air accounts for around 95% of person movements to North Ronaldsay and Papa Westray.**
- 3.2.3 Connectivity to Kirkwall is a mixture of direct and indirect services. Indirect flights do not add a significant amount of time to the overall journey duration. However, the situation is very different with ferries, as is set out in the table below:

Table 3.1: Ferry Crossing Times – Summer Timetable

Summer Timetables 2014	Crossing Time	Via			
		<i>Eday</i>	<i>Stronsay</i>	<i>Sanday</i>	<i>Papa Westray</i>
To Kirkwall...from	Direct, hh:mm				
Eday	1:15	-	2:20 (+1:05)	1:55 (+0:40)	-
Sanday	1:25	1:45 (+0:20)	-	-	-
Stronsay	1:35	2:05 (+0:30)	-	-	-
Westray	1:25	-	-	-	2:50 (+1:25)
North Ronaldsay	2:40	-	-	-	3:35 (+0:55)
Papa Westray	1:50	-	-	-	-

3.2.4 The table above demonstrates the significant addition to crossing times caused by indirect sailings. These extended journey times are likely to be a significant disincentive to using the ferry. This is particularly noticeable for Eday, where a service via Stronsay adds over one hour to the journey time, whilst a service via Sanday adds 40 minutes to the journey time. The Papa Westray calls on the North Ronaldsay and Westray services add significantly to journey times, but this is not seen as a major an issue as this only affects one service a week for each island and carryings on these services are typically very low in any case.

The following analysis focusses extensively on the connectivity of the six Outer North Isles. The Baseline Report considered summer and winter timetables for both air and ferry services and found the level of connectivity to be broadly similar (except perhaps during refit periods). In the interests or brevity, the following analysis is focussed on the 2014 summer timetables, noting any major differences between summer and winter.

3.2.5 The level of summer 2014 connectivity to Kirkwall from each island is summarised in the table below in terms of weekly direct and indirect connectivity. It should however be noted that availability can be a major issue on certain flights, due to the movement of teachers, school children etc (this issue is explored in more detail later in this report).

Table 3.2: Overall Connectivity of Outer North Isles – Summer Timetable

Summer T'table 2014	Popu-lation	Weekly Ferry Departures to Kirkwall			Weekly Air Departures to Kirkwall			Total Connections to Kirkwall	% Direct Connections
		Direct	Indirect	Total	Direct	Indirect	Total	Per week	
Eday	160	8	6	14	2	0	2 ¹	16	63%
Sanday	494	11	3	14	6	6	12	26	65%
Stronsay	349	9	5	14	6	6	12	26	58%
Westray	588	16	1	17	6	6	12	29	76%
N Ronald	72	1	1	2	13	7	20	22	64%
Papa Westray	90	2	0	2	10	9	19	21	57%

3.2.6 The key points from the above table and figures are:

- it is possible to make a weekday trip to Kirkwall from all islands;

¹ It should be noted that whilst Eday has two direct flights in the timetable, the Monday morning service is restricted by the number of school children that have boarded the flight in North Ronaldsay. Eday residents can only book on the Monday morning flight from 1500 onwards on a Sunday, which means this is not considered a reliable option for travel

- ferry connectivity is very similar between Eday, Sanday and Stronsay, although Sanday has more direct connectivity;
- Westray has the best ferry connectivity and almost all services are direct to Kirkwall;
- air service connectivity is very similar between North Ronaldsay and Papa Westray;
- Eday's air service is very poor relative to other islands;
- the overall level of connectivity (ie total connections per week) is broadly similar (ranging from 16-29) across the six islands;
- broadly speaking, the level of connectivity increases with population, with Westray having the best connectivity and the highest population – the outlier is Eday where connectivity is low compared to the other islands; and
- Westray also has the highest proportion of direct connections (76%), with Papa Westray (57%) and Stronsay (58%) the lowest.

3.2.7 The time of the first air and ferry departure from each island varies significantly across the week, as shown in the tables below.

Table 3.3: First Island Departures - Ferry

Ferry	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Eday	09:05	09:45	09:40	09:40	08:20	08:30 ²	17:50
Sanday	08:00	09:15 ³	07:30	09:15	12:05	09:15	17:20 ⁴
Stronsay	08:15 ⁵	09:10	08:50 ⁶	08:50 ⁷	07:30 ⁸	09:20	17:10
Westray	08:30	08:40	09:00	09:00	09:00	09:00	18:00
Papa Westray		Time Varies			13:20		
North Ronaldsay		Time Varies			Time Varies		

3.2.8 In general, the first ferry departure of the day is outbound from Kirkwall, which is important from the perspective of meeting the morning supply chain needs of the islands and in allowing

² Via Stronsay

³ Via Eday

⁴ Via Eday

⁵ Via Eday

⁶ Via Eday

⁷ Via Eday

⁸ Via Eday

tradesmen onto the islands for a day's work. However, it limits the amount of time islanders can spend on the mainland using the ferry and rules out any realistic possibility of commuting.

- 3.2.9 Sanday, Stronsay and Westray all have early departures on Mondays as the three vessels are berthed overnight on these islands on a Sunday. This is also the case on Sanday on a Wednesday and Stronsay on a Friday. The potential offered by increased overnight berthing on the islands will be considered in this study but it is worth noting that there are currently constraints on the number of nights the crew can sleep onboard (discussed later in this report).

Table 3.4: First Island Departures - Air

Ferry	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Eday	08:12 ⁹		08:11				
Sanday	10:07	08:57	09:07	08:57	08:57	09:57	18:05 ¹⁰
Stronsay	09:56 ¹¹	08:46 ¹²	08:56 ¹³	08:46 ¹⁴	08:46 ¹⁵	09:46 ¹⁶	18:16 ¹⁷
Westray	09:01 ¹⁸	09:49 ¹⁹	10:01 ²⁰	09:49 ²¹	09:49 ²²	08:49 ²³	15:58
Papa Westray	09:08	09:56	10:08	09:56	09:56	08:56	10:51 ²⁴
North Ronaldsay	07:58 ²⁵	07:58	07:58 (via Eday)	07:58	07:58	10:53	11:06

- 3.2.10 Over the piece, each island except Eday has a daily morning departure to Kirkwall, although weekend provision is more limited. The key problem on some of these morning services is

⁹ School-term only

¹⁰ Via Stronsay, request)

¹¹ Via Sanday

¹² Via Sanday

¹³ Via Sanday

¹⁴ Via Sanday

¹⁵ Via Sanday

¹⁶ Via Sanday

¹⁷ Request

¹⁸ Via Papa Westray

¹⁹ Via Papa Westray

²⁰ Via Papa Westray

²¹ Via Papa Westray

²² Via Papa Westray

²³ Via Papa Westray

²⁴ Via North Ronaldsay

²⁵ Via Eday during school term

capacity, with itinerant teachers and school children filling most, if not all, of the capacity on certain flights.

3.2.11 A key question for both air and ferry services is the maximum amount of time permitted in Kirkwall on a given day. The figure below shows the maximum time in Kirkwall for ferry services in the summer timetable.

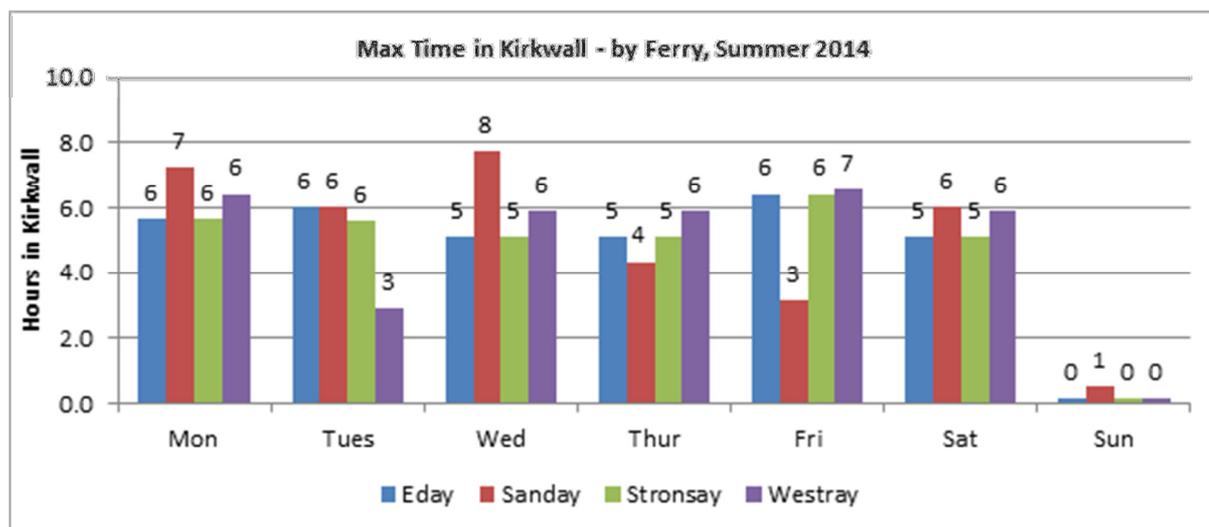


Figure 3.1: Maximum Time in Kirkwall by Ferry, Summer 2014

3.2.12 The key points from the above figure are as follows:

- a day trip to Kirkwall is not possible by ferry from Papa Westray or North Ronaldsay;
- it is typically possible to spend 5-7 hours per day in Kirkwall – this is not sufficient for a typical working day but could support shopping, health appointments, business meetings etc.
 - the exceptions to this are Westray on a Tuesday and Sanday on a Thursday and Friday, when only a much shorter time is permissible;
- the daily pattern is not regular, with the greatest variation overall being for Sanday;
- it is not possible to make a return trip to Kirkwall on a Sunday by ferry from any island;
- these times in Kirkwall are reduced somewhat in the winter timetable by around 30-60 minutes (October – May inclusive, excluding January to March when the refit timetable is in operation); and
- Westray sees a major reduction in Kirkwall time in the winter on a Tuesday and Thursday.

3.2.13 The chart below shows the same information for the air service.

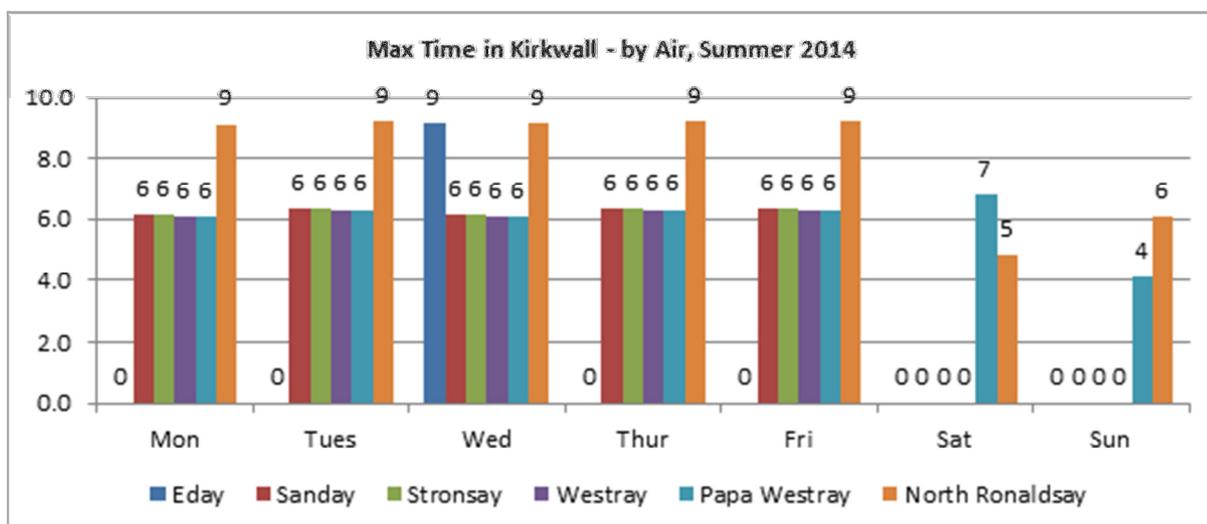


Figure 3.2: Maximum Time in Kirkwall by Air, Summer 2014

3.2.14 The key points from the above figure are as follows:

- flights from North Ronaldsay allow nine hours in Kirkwall on weekdays, significantly more than any other island;
- Sanday, Stronsay, Westray and Papa Westray have near identical services on weekdays; and
- a return trip to Kirkwall from Eday is only possible on a Wednesday, meaning Eday has by far the lowest level of service provision. Note that during ferry refit periods, an additional return flight to Eday operates.

Infrequent Travel

3.2.15 An important issue to consider when planning the future form of the transport network connecting the Outer North Isles with the mainland is the low travel frequency. This is likely to be driven by a number of factors including the distance of these islands from the mainland, limited transport options currently and a degree of self-sufficiency.

3.2.16 The evidence underpinning this issue of infrequent travel can be found in terms of three indicators:

- low resident travel frequency
- seasonality; and
- a trade imbalance between the Outer North Isles and the Orkney mainland.

A discussion of each of these factors is provided below.

Low Travel Frequency

3.2.17 The tables below show the most common trip frequency cited for different purposes from each of the Outer North Isles by ferry and air. The data are extracted from the Orkney Outer North Isles Travel Survey recently undertaken to inform the RSM work.

Table 3.5: Use of the Ferry²⁶ by Island Residents by Purpose

Island	Overall	Commuting	Business	Health	Other
Eday	Once a Week (44%)	Never (72%)	Less than once a week (56%)	Less than once week (56%) ²⁷	Less than once week (56%)
North Ronaldsay	Less than once a month (50%)	Never (100%)	Never (56%)	Never (67%)	Less than once a week (89%)
Papa Westray	Less than once a month (59%)	Never (76%)	Never (67%)	Never (81%)	Less than once a week (95%)
Sanday	Once or twice a month (61%)	Never (86%)	Never (53%)	Less than once a week (86%)	Less than once a week (78%)
Stronsay	Once or twice a month (48%)	Never (81%)	Never (55%)	Less than once a week (85%)	Less than once a week (85%)
Westray	Once or twice a month (60%)	Never (76%)	Less than once a week (50%)	Less than once a week (82%)	Less than once a week (84%)

3.2.18 It is clear from the table above that ferry use is irregular amongst residents of the Outer North Isles. Whilst the frequency definitions are imprecise, only Eday residents responded that that they use the ferry as frequently as weekly, and this is likely a product of their very limited air service. Given the very low ferry frequencies, residents of North Ronaldsay and Papa Westray use the ferry very infrequently.

3.2.19 The distance and the length of the crossing times from the Outer North Isles means that the ferry is not a realistic option for commuting for most people. Where people do claim that they commute, it is likely that this is for a working week, rather than a working day off of the island. The only potential exception to this is Papa Westray, where residents may use the foot passenger service to get to work on Westray (or vice versa). The ferry is used infrequently for all other purposes.

Table 3.6: Use of the Air Service²⁸ by Island Residents by Purpose

Island	Overall	Commuting	Business	Health	Other
Eday	Less than once a month (50%)	Never (60%)	Never (50%)	Never (80%)	Never (50%)
North Ronaldsay	Once or twice a month (42%)	Never (58%)	Less than once a week (58%)	Less than once a week (75%)	Less than once a week (67%)

²⁶ The journey frequencies used in the survey were “Never”, “less than once a month”, “less than once a week”, “once a week”, “twice a week”, “three times a week”, “four times a week”, “five times a week” and “more than five times a week”.

²⁷ The other 44% of respondents never use the ferry for health related purposes.

²⁸ The journey frequencies used in the survey were “Never”, “less than once a week”, “once a week”, “twice a week”, “three times a week”, “four times a week”, “five times a week” and “more than five times a week”.

Island	Overall	Commuting	Business	Health	Other
Papa Westray	Once or twice a month (68%)	Never (76%)	Never / Less than once a week (48%)	Less than once a week (76%)	Less than once a month (95%)
Sanday	Less than once a month (76%)	Never (88%)	Never (79%)	Less than once a week (74%)	Less than once a week (69%)
Stronsay	Less than once a month (66%)	Never (86%)	Never (69%)	Less than once a week (80%)	Less than once a week (63%)
Westray	Less than once a month (62%)	Never (83%)	Never (65%)	Less than once a week (65%)	Less than once a week (73%)

3.2.20 Despite the shorter journey times, the air service is also used relatively infrequently, typically for health and other personal business purposes.

3.2.21 Overall, the use of both transport options from the Outer North Isles is limited, although we are not clear at this stage how much this is caused by the limited connectivity and capacity on offer. This presents a challenge when network planning in that there is a lack of the core demand which is seen on other routes across Scotland.

Seasonality

3.2.22 The routes to the Outer North Isles are also highly seasonal, presenting another challenge in terms of meeting summer capacity needs without over-specifying the service during the winter months. There is an issue of seasonality on the ferries, as is highlighted in the table below. The air service is typically much less seasonal in nature.

Table 3.7: Outer North Isles Seasonality – April-September Ferry Carryings as % of Total

Island	Passengers (April - Sept)	Cars (April – Sept)	CVs (April – Sept)
Eday	62%	59%	65%
North Ronaldsay	94%	Not applicable	Not applicable
Papa Westray	88%	Not applicable	Not applicable
Sanday	66%	62%	57%
Stronsay	64%	63%	60%
Westray	67%	64%	59%

3.2.23 The table shows that between three fifths and two thirds of all passenger, car and commercial vehicle carryings on the routes to and from Kirkwall from Eday, Sanday, Stronsay and

Westray are carried between April and September, with a number of these routes showing a particular peak in the high summer months.

3.2.24 The seasonality figures for passengers on the North Ronaldsay and Papa Westray routes are particularly high, which highlights the importance of the air service as the preferred mode of travel to the mainland amongst residents.

Trade Imbalance

3.2.25 Almost all Scottish islands are characterised by a significant trade imbalance with the Scottish mainland. This same issue is noticeable in the Outer North Isles, although the trade imbalance is with the Orkney mainland rather than the Scottish mainland. This imbalance is hard to identify for Eday, Sanday, Stronsay and Westray because commercial movements are recorded in terms of the number of CVs, which are broadly balanced in volume terms in each direction (because the CV goes on to and off the island), although we have no indication of what is being carried on each leg.

3.2.26 The picture becomes much clearer when considering North Ronaldsay and Papa Westray because the Lo-Lo nature of these routes means that commercial traffic is recorded in tonnage rather than vehicles. By means of an example of this trade imbalance, the figure below shows inbound and outbound tonnage on the Kirkwall – Papa Westray route between April 2013 and March 2014:

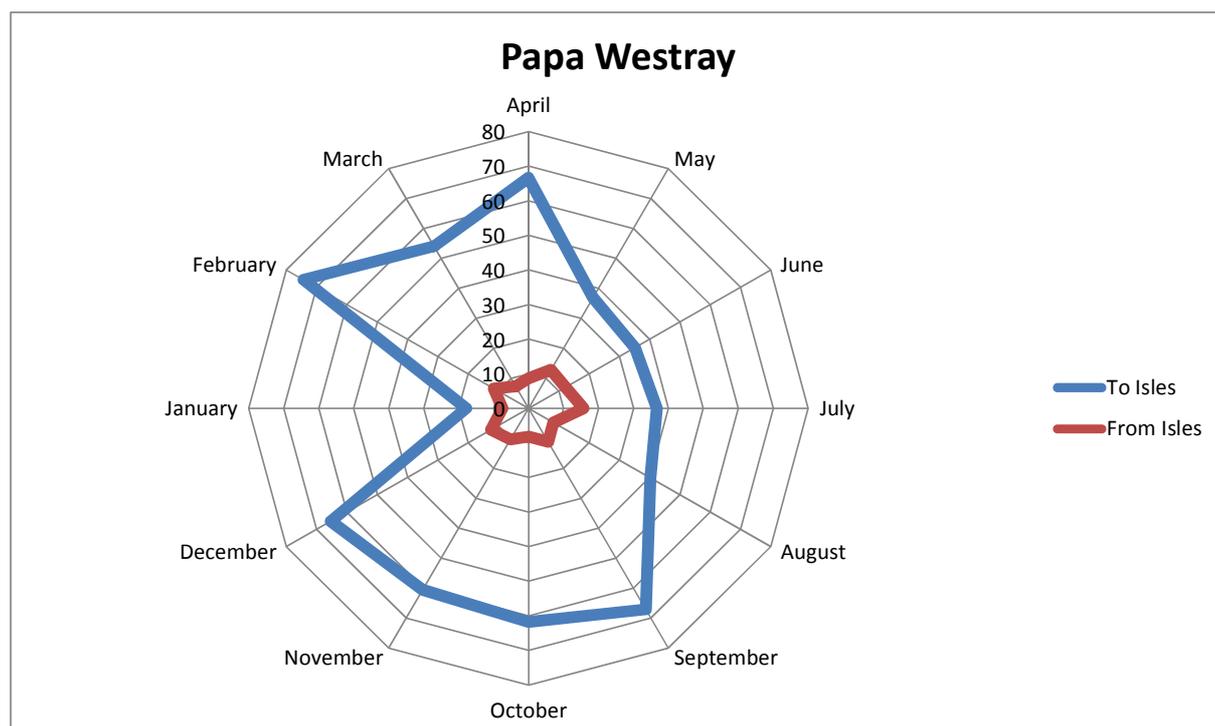


Figure 3.3: Tonnage Carried – Papa Westray – Kirkwall Route, April 2013 – March 2014

3.2.27 The extent of the trade imbalance in Papa Westray can be seen from the above figure, with inbound tonnage typically being larger than the outbound equivalent by a factor of six. The pattern is similar on North Ronaldsay and will likely also be the case for the other Outer North Isles, although we do not have firm evidence to prove this.

3.2.28 Overall, the limited use of the transport services from the Outer North Isles combined with marked seasonality and a large trade imbalance presents significant challenges in terms of network planning for the future of the Outer North Isles network. Balancing the economic and

social needs of islanders against the costs of operating an infrequently used service is a challenge, one that must be addressed in setting the Transport Planning Objectives for this study.

Ageing Assets

Ferries

- 3.2.29 The main driver behind this study is the ageing infrastructure serving the Outer North Isles. In terms of the ferries, the typical working life of a vessel in UK waters is 30 years. Whilst vessels can continue for an almost indefinite period (the oldest of Orkney Ferries' vessels, the MV *Golden Mariana*, is 41 years old), as a rule of thumb, they become costly to maintain after 30 years. Indeed, they are often effectively written off in that it costs more to maintain the vessel than it is worth.
- 3.2.30 The current Outer North Isles vessels will each reach their 30th birthday before the end of this decade, the MV *Varagen* in 2018 and the MV *Earl Sigurd* and MV *Earl Thorfinn* in 2019. The vessels are already sailing with a range of Maritime and Coastguard (MCA) exemptions and are in need of replacement. Whilst these vessels will not automatically be replaced on their 30th birthday, the cost of maintaining and continuing to run them post 2018-19 is likely to increase.
- 3.2.31 Ferries, not to mention landside infrastructure, have a lead time of 2-3 years depending on the buoyancy of the shipbuilding market. The issue of fleet replacement, the scope of the future Outer North Isles network and how this will be funded is therefore arguably the time critical problem which this study must address.

Aircraft

- 3.2.32 Like the ferry fleet, the Britten-Normen Islanders which serve the Outer North Isles are ageing. Loganair explained that the aircraft could continue in service indefinitely. However, they noted that they would realistically look to begin replacing the aircraft in six to seven years' time and they also feel that the Islander currently remains the best aircraft to serve this network. The lead time for an Islander is around two years and the aircraft can also be procured from the second hand market, so the asset replacement need is less pressing than for the ferries but still an important consideration overall.

Requirement for Lo-Lo Vessels

- 3.2.33 The continued requirement for Lo-Lo vessels to serve North Ronaldsay and Papa Westray is a problem which will have to be considered in some detail as part of the option generation phase of this study. This issue is discussed in more detail in the 'Constraints' section below, but the problems can be summarised as follows:
- Lo-Lo vessels are typically less efficient than Ro-Ro vessels as the lifting derrick consumes valuable space and is not aerodynamic.
 - With the current Outer North Isles fleet coming to the end of its working life, there will be a need to procure at least two new Lo-Lo vessels if this issue is not resolved.
 - the Tuesday and Friday calls at North Ronaldsay and Papa Westray during the summer timetable consume almost **17 hours** of operating time but these crossings carry very few passengers and cars / tonnage.
- 3.2.34 Overall, a resolution of the problems faced in serving North Ronaldsay and Papa Westray would add significant extra capacity into the timetable for the other four islands.

Aircraft Capacity

- 3.2.35 The Islander aircraft can only accommodate eight passengers (nine if weight restrictions allow) and lack of capacity is seen to be a major issue and deterrence to travel amongst islanders. It is our understanding that the cited capacity problems relate to specific peak flights, for example morning flights on a Monday used to convey children to school (see below).
- 3.2.36 The only evidence available on latent demand was a study undertaken between February and September 2012 where Loganair monitored unsatisfied demand for inter-isles services via its reservations line in Kirkwall. Each call where the passenger was unable to travel on his/her first choice of flight was logged, noting the date of call; intended travel date; travel route; number of passengers and alternative means of travel taken by the passenger.
- 3.2.37 The data analysis identified 1,253 passengers who were unable to travel on their preferred flight – this equates to approximately 10% of total passengers over that period. 47% of the passengers who could not access their preferred flight chose not to travel at all – some 583 passengers in all. Of the remainder, 22% flew on another day and 29% travelled by ferry instead (the remaining 3% did not know or chose not to say what their alternatives were).
- 3.2.38 The data analysis indicates consistency across the months – ie the turned-away demand fell evenly throughout the months analysed and the capacity issue is not solely confined to the peak summer season.
- 3.2.39 This study provided reasonably conclusive evidence of a capacity issue on the Outer North Isles air network.

Delivering School & Health Services

- 3.2.40 One of the known capacity issues on the air service is caused by the need to convey children to the mainland for school and itinerant teachers to the islands. In particular, air services are key to delivering the McCrone cover for teachers, something which could not be delivered by ferry services. Children and teachers travel on a range of different flights but the baselining report identified where particular pinchpoints exist. This is summarised in the table below:
- 3.2.41 In particular, it is worth noting that there is need for a teacher to go out to Eday on an *ad hoc* basis, which is why the times are scheduled as they are at present.

Table 3.8: Flights Used for Education Purposes

Flight	Day	Route	Comment
377	Sunday	Kirkwall – North Ron – PW - Kirkwall	2 children board in Papa Westray (25% of capacity).
311	Monday	Kirkwall – North Ron – Eday - Kirkwall	2 children board in North Ronaldsay (25% of capacity) and a further 2 children board in Eday (cumulative 50% of capacity).
312	Monday	Kirkwall – Westray – PW - Kirkwall	2 teachers (25% of capacity) board in Kirkwall and alight in Westray. 3 children board in Papa Westray (38% of capacity).
313	Monday	Kirkwall – Stronsay –	6 teachers board in Kirkwall (75% of capacity), 2

Flight	Day	Route	Comment
		Sanday - Kirkwall	alight in Stronsay and 4 alight in Sanday.
317	Monday	Kirkwall – Papa Westray – Westray - Kirkwall	2 teachers board in Westray (25% of capacity).
318	Monday	Kirkwall – Stronsay – Sanday - Kirkwall	4 teachers board in Sanday (50% of capacity) and a further 2 teachers board in Stronsay (cumulative 75% of capacity).
322	Tuesday	Kirkwall – Stronsay – Sanday - Kirkwall	5 teachers board the plane in Kirkwall (63% of capacity), with 3 alighting in Stronsay and 2 in Sanday.
323	Tuesday	Kirkwall – Westray – Papa Westray - Kirkwall	4 teachers (50% of capacity) board in Kirkwall and alight in Westray.
327	Tuesday	Kirkwall – Stronsay – Sanday - Kirkwall	2 teachers board the plane in Sanday (25% of capacity), with a further three boarding in Stronsay (cumulative 63% of capacity)
328	Tuesday	Kirkwall – Papa Westray – Westray - Kirkwall	4 teachers board in Westray (50% of capacity).
332	Wednesday	Kirkwall – Stronsay – Sanday - Kirkwall	7 teachers board the plane in Kirkwall (88% of capacity) with 5 alighting in Stronsay and 2 alighting in Sanday
333	Wednesday	Kirkwall – Westray – Papa Westray - Kirkwall	1 teacher (13% of capacity) boards in Kirkwall and alights in Westray.
337	Wednesday	Kirkwall – Stronsay – Sanday - Kirkwall	2 teachers board the plane in Sanday (25% of capacity), with a further five boarding in Stronsay (cumulative 88% of capacity)
338	Wednesday	Kirkwall – Papa Westray – Westray - Kirkwall	1 teacher boards in Westray (13% of capacity).
342	Thursday	Kirkwall – Stronsay – Sanday - Kirkwall	6 teachers board the plane in Kirkwall (75% of capacity), with 3 alighting in Stronsay and 3 alighting in Sanday
343	Thursday	Kirkwall – Westray –	2 teachers (25% of capacity) board in Kirkwall

Flight	Day	Route	Comment
		PW - Kirkwall	and alight in Westray.
347	Thursday	Kirkwall – Stronsay – Sanday - Kirkwall	3 teachers board the plane in Sanday (38% of capacity), with a further 3 boarding in Stronsay (cumulative 75% of capacity)
348	Thursday	Kirkwall – Papa Westray – Westray - Kirkwall	2 teachers board in Westray (25% of capacity).
352	Friday	Kirkwall – Stronsay – Sanday - Kirkwall	7 teachers board the plane in Kirkwall (88% of capacity), with 4 alighting in Stronsay and 3 alighting in Sanday.
353	Friday	Kirkwall – Westray – PW - Kirkwall	1 teacher (13% of capacity) boards in Kirkwall and alights in Westray.
357	Friday	Kirkwall – Stronsay – Sanday - Kirkwall	3 teachers board the plane in Sanday (38% of capacity), with a further 4 boarding in Stronsay (cumulative 88% of capacity)
356	Friday	Kirkwall – PW – North Ron - Kirkwall	7 children board in Kirkwall (88% of capacity), with five alighting in Papa Westray and two alighting in North Ronaldsay. This service is specifically for pupils and would not otherwise exist.
358	Friday	Kirkwall – Papa Westray – Westray - Kirkwall	1 teacher boards in Westray (13% of capacity).

3.2.42 The most noticeable issue from the above table is that Sanday & Stronsay effectively lose the majority of the capacity on the outbound morning flight from Kirkwall and the inbound inter-peak / evening flight from the island. This is a key issue because, with only two return flights a day, the lack of capacity on the planes makes a day return by plane particularly difficult to achieve during the school-term. There is likely to be a negative effect on demand amongst other user groups, with the reduction in effective capacity potentially inhibiting other travellers. However, whilst education and indeed health consume significant capacity on the flights, the inter-island air network is essential to meeting the travel needs of these key services.

3.2.43 The issue is less prominent in other islands, although the Monday morning flights out of North Ronaldsay & Papa Westray and the Friday afternoon return services have very limited capacity, which could have a negative impact on any islander undertaking a 'week commute' (ie spending Monday to Friday on the mainland).

Integration at Kirkwall Airport

3.2.44 Kirkwall Airport is approximately 3.3 miles away from the town centre. It is our understanding that many islanders leave a second car at the airport or make use of the half hourly bus (which carries around 25,000 passengers per annum) or taxis. There is a potentially valuable opportunity for developing a car share scheme or car club, potentially based around electric vehicles.

3.2.45 The next section considers the island specific issues which are not covered in the above analysis.

Eday

Connectivity

The table below summarises the connectivity from Eday to / from Kirkwall for each time period.

- AM Peak – 0700-1000
- Inter Peak – 1000-1600
- PM Peak – 1600-1900
- Evening – 1900 onwards

3.2.46 It shows whether it is possible to make a trip to / from Kirkwall in the relevant time period by air or ferry (based on summer 2014 timetables) as follows:

- ✓ direct ferry connection
- ✓ indirect ferry connection (ie via another island)
- → direct air connection (note that a direct air connection may have previously called at another island and thus capacity may be an issue. For example, the direct Monday morning service from Eday comes from North Ronaldsay,
- → indirect air connection (ie via another island)
- a blank cell indicates no connectivity, and hence a 'gap' in provision
 - So for example, it is possible to travel from Eday to Kirkwall leaving on a Wednesday AM (0700-1000) by direct ferry or direct flight.

Table 3.9: Eday Connectivity

	Departures from EDAY to Kirkwall							Departures from Kirkwall to EDAY						
	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Sun
AM	✓→	✓	✓→	✓	✓	✓		→	✓	✓→	✓		✓	✓
Inter	✓		✓→		✓			✓		✓→		✓		
PM	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Evening														✓

3.2.47 The key points to note are:

- Eday has no evening service, either be ferry or air;

- there is a weekday direct ferry to Kirkwall in the AM;
- there is a weekday direct ferry from Kirkwall in the PM;
- there are only inter-peak ferries on a Monday, Wednesday and Friday, with the Monday and Wednesday to Kirkwall and the Friday service to Eday being indirect;
- there is only one connection to Kirkwall on Tuesdays and Thursdays, which means that a day-trip from Eday to the mainland is not possible during these periods; and
- the air service is highly irregular, with the Monday morning outbound flight half full with school children.

Dissatisfaction with Transport Links

3.2.48 The analysis undertaken earlier in this chapter highlighted Eday’s poor connectivity relative to the other Outer North Isles. It is therefore unsurprising that the recent survey of residents found that 67% of Eday respondents were either “Quite Dissatisfied” or “Very Dissatisfied” with the island’s current transport links. This is a key issue in an island community, where transport is typically much higher on the list of policy priorities than it would be amongst non-island communities.

North Ronaldsay

Connectivity

3.2.49 The tables below show North Ronaldsay’s connections to / from Kirkwall.

Table 3.10: North Ronaldsay Connectivity

	Departures from NORTH RONALDSAY to Kirkwall							Departures from Kirkwall to NORTH RONALDSAY						
	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Sun
AM	→	→	→	→	→			→	✓→	→	→	✓→		
Inter	→	✓→	→	→	✓→	→→	→	→	→	→	→	→	→→	→
PM	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Evening														

3.2.50 The key points to note from the above tables are:

- there is no evening travel options from North Ronaldsay on either mode;
- North Ronaldsay’s lifeline service is by air, with three flight departures and arrivals per day, weekdays and Saturdays;
- the Monday AM departure from North Ronaldsay and the Friday afternoon flight from Kirkwall are mainly used by school children;
- Near 7-day AM air service to Kirkwall;
- Near 7-day PM service from Kirkwall;
- 7 day inter-peak connection to and from Kirkwall;

- North Ronaldsay has very limited ferry connections with only one Tuesday and Friday call during the summer timetable. This reduces to one ferry a week during the winter timetable, which can present a significant supply chain challenge for the island if one or more ferries is cancelled due to the weather; and
- 50% of North Ronaldsay residents are either “Very Satisfied” or “Quite Satisfied” with their transport services, with only 16% either “Quite” or “Very Dissatisfied”.

Ageing Population & the Ferry Service

3.2.51 The previous chapter highlighted the overall issue of an ageing population in North Ronaldsay. This has a particular consequence in terms of the ferry service. Orkney Ferries indicated during the consultation phase that the task of securing the ferry’s lines at a challenging port like North Ronaldsay requires fit and able people and the company foresees a situation in the future where there will be little or no islanders able to fulfil this function, putting the ferry service at risk.

Papa Westray

Connectivity

3.2.52 The tables below show Papa Westray’s connections to / from Kirkwall.

Table 3.11: Papa Westray Connectivity

	Departures from PAPA WESTRAY to Kirkwall							Departures from Kirkwall to PAPA WESTRAY						
	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Sun
AM	→	→		→	→	→		→	→	→	→	→	→	
Inter	→→	✓→	→→	→	✓→		→→	→	✓→	→	→	✓→		→→
PM		→	→	→	→	→		→	→	→	→	→	→	
Evening														

3.2.53 The key points to note from the above table are:

- there is no evening service to or from Papa Westray;
- Papa Westray has three weekday flight departures and arrivals per day;
- there is a near seven day AM air service to Kirkwall;
- there is a near seven day AM air service from Kirkwall, although all flights are indirect;
- there is a direct evening flight from Kirkwall to Papa Westray on all weekdays;
- Papa Westray has very limited ferry connections with only one Tuesday and Friday call during the summer timetable; and
- 82% of Papa Westray residents are either “Very Satisfied” or “Quite Satisfied” with their transport services, with only 10% either “Quite” or “Very Dissatisfied”.

Sanday

Connectivity

3.2.54 The tables below show Sanday’s connections to / from Kirkwall.

Table 3.12: Sanday Connectivity

	Departures from SANDAY to Kirkwall							Departures from Kirkwall to SANDAY						
	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Sun
AM	✓	✓→	✓→	✓→	→	✓→		→	✓→	→	✓→	→	✓→	✓
Inter	✓→	→	✓→	→	✓→			✓	→	✓→	✓→			
PM	✓→		✓	✓	✓	✓		✓→	✓	✓		✓	✓	→
Evening														✓

3.2.55 The key points to note from the above table are:

- There is no evening service from Sanday on either mode;
- there is a weekday AM ferry to Kirkwall every day except a Friday
- there are only inter-peak ferries to Kirkwall on Mondays, Wednesdays and Fridays;
- there is a weekday PM ferry to Sanday (except Thursday);
- there is only one (indirect) ferry to Kirkwall on a Tuesday – this means a day trip from the mainland to Sanday by ferry is not possible on a Tuesday;
- there is no AM air service to Kirkwall on Mondays;
- a key point to note is that the AM departure from Kirkwall and PM departure from Sanday are almost full to capacity every weekday with itinerant teachers; and
- 43% of Sanday residents are either “Very” or “Quite Satisfied” with their transport services, whilst 24% are “Quite Dissatisfied” and 8% are “Very Dissatisfied”.

Stronsay

Connectivity

3.2.56 The tables below show Stronsay’s connections to / from Kirkwall.

Table 3.13: Stronsay Connectivity

	Departures from STRONSAY to Kirkwall							Departures from Kirkwall to STRONSAY						
	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Sun
AM	✓→	✓→	✓→	✓→	✓→	✓→		→	✓→	✓→	✓→	→	✓→	✓
Inter	✓		✓					✓	→	✓→	→	→		
PM	✓→	✓→	✓→	→	✓→	✓		✓→	✓	✓	✓	✓	✓	✓→
Evening														

3.2.57 The key points to note from the above table are:

- there is no evening service using either mode;
- there is a weekday AM ferry from Stronsay, which calls at Sanday on its way to Kirkwall;

- there is only an inter-peak ferry to and from the island on a Monday and Wednesday;
- there is a 7 days a week PM departure from Kirkwall to Stronsay, although four of these services are indirect;
- there is only one (indirect) ferry to Kirkwall on a Thursday – this means a day trip from the mainland to Stronsay by ferry is not possible on a Thursday;
- there is a six day a week AM air service to Kirkwall (via Sanday);
- there is no daily PM air service from Kirkwall; and
- a key point to note is that the AM departure from Kirkwall and PM departure from Stronsay are almost full to capacity every weekday with itinerant teachers.

Dissatisfaction with Current Transport Links

3.2.58 The recent survey of island residents found that 41% of Stronsay residents are either “Quite Dissatisfied” or “Very Dissatisfied” with the island’s transport links, likely because the majority of their services are shared with Sanday.

Westray

Connectivity

3.2.59 The tables below show Westray’s connections to / from Kirkwall.

Table 3.14: Westray Connectivity

	Departures from WESTRAY to Kirkwall							Departures from Kirkwall to WESTRAY						
	Mon	Tues	Wed	Thur	Fri	Sat	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Sun
AM	✓→	✓→	✓	✓→	✓→	✓→		✓→	✓→	✓→	✓→	✓→	✓→	✓
Inter	✓→	✓	✓→	✓	✓		→	→	✓	✓	✓			→
PM	✓	→	✓→	✓→	✓→	✓	✓	✓	→	✓→	✓→	✓→	✓	
Evening														✓

3.2.60 The key points to note from the above table are:

- there is no evening service on either mode from Westray;
- there is a weekday direct ferry in each direction (and indeed a seven day ferry from Kirkwall);
- there is an inter-peak ferry service in each direction on all weekdays, except outbound from Kirkwall on a Monday;
- there is no Tuesday PM ferry outbound from Kirkwall;
- there is a five day air service to Kirkwall, although all flights travel via Sanday;
- there is a near five day PM air service to Kirkwall; and
- 50% of Westray residents are either “Quite” or “Very Satisfied” with their transport services, whilst 27% are either “Quite” or “Very Dissatisfied”.

3.3 Issues

- 3.3.1 In STAG parlance, issues are uncertainties which the study may not be in a position to resolve but must work within the context of. This section sets out some of the key issues that could have an impact on this study. The issues identified here are fundamental to the future direction of transport policy for the Outer North Isles – there are some significant questions to be answered, including how new tonnage will be procured and the potential role of tendering in supporting the ferries network.

Future Funding for Ferries

- 3.3.2 At present, Orkney Ferries is wholly owned by Orkney Islands Council. Revenue funding is allocated by the Council, whilst capital funding has historically been funded directly by the Council, either through grants or loans. Orkney Islands Council is currently working with Transport Scotland to consider the long-term capital and revenue funding position for fleet replacement and ongoing operation.

Air Service Tender

- 3.3.3 The tendering for the air service is much simpler given the lower costs of the assets and the wide availability of Islanders, either new or second hand. However, one point worth noting is that the current Islanders are owned outright by Loganair. As with the ferries, when the time comes to replace these aircraft, consideration has to be given to who will fund and provide the replacement aircraft (although the Council has specifically ruled out funding new aircraft). The inclusion of new aircraft within the tender could significantly increase the cost of the PSO.

3.4 Opportunities

Our Islands, Our Future

- 3.4.1 In the period since this study commenced, the Scottish Government has issued its *Empowering Scotland's Island Communities Prospectus* as part of the "Our Islands, Our Future" initiative. The *Our Islands, Our Future* document references the disproportionate financial burden placed on island local authorities by the operation of ferry services. It further explains that the Scottish Government recognises that the provision of transport services **should not place a disproportionate financial burden on any Council**, with particular reference to the revenue and ferry replacement costs of the internal Orkney Islands services. The document commits to meaningful negotiation to conclude this issue.
- 3.4.2 From a political and funding perspective, this should be seen as a key opportunity in the context of this study.

Network-Wide

Role of Transport Scotland (Ferries)

- 3.4.3 The Scottish Ferries Plan 2013-22 established the methodology for assessing transportation need for each community through the Routes & Services Methodology (RSM) and the principle of a fair and equal standard of lifeline service provision across all of Scotland. The RSM outcomes present an opportunity for an informed discussion with Transport Scotland on future ferry service funding.

Ferries – Procurement Options

- 3.4.4 As part of this study, the Council may wish to consider the procurement routes available to it for delivering the identified level of service. It is outwith the scope of this report to comment

on procurement options in detail, but in line with the objective-led approach to STAG, there would be some benefit from exploring different funding and procurement options.

Runway Lighting

- 3.4.5 Of the six Outer North Isles, only North Ronaldsay currently has runway lighting. As the Islanders fly on the basis of Visual Flight Rules (VFR), lighting can assist in extending the operating day by allowing night flight operations.
- 3.4.6 Loganair have been very clear that there are stricter rules for flying in darkness and that runway lighting is not a simple solution for extending the operating day. However, consideration should be given to extending runway lighting as part of a wider package of measures designed to enhance the air service, a key point to consider going forward.
- 3.4.7 Overall, if a network-wide package of runway lighting was rolled out and could operate reliably, there would be significant scope to extend the operating day and increase the overall level of service. However, the actual effectiveness of runway lighting would need to be robustly demonstrated, both through evaluating the success or otherwise of the North Ronaldsay scheme as well as any other pertinent examples.
- 3.4.8 It is worth noting here that feedback from the Council suggests that the lighting on North Ronaldsay has not been without its issues. As previously noted, the CAA insist on more stringent conditions for night flying and, as a result, many of the night flights (31% or 22 of 72 in 2013-14) to North Ronaldsay were not been operated as per the timetable. The current schedule has a reserve afternoon slot in the event that the evening service to North Ronaldsay needs to be brought forward, which is regularly the case. In this event, passengers are contacted and they travel home at an earlier time, meaning that the service is less reliable overall. This same flexibility would clearly also be required if night flying was operated to other islands, which could necessitate an additional aircraft and crew.
- 3.4.9 Runway lighting presents a clear opportunity but, at the same time, understanding the potential issues on an island-by-island basis as well as the necessary slack in the system would clearly be key in advance of any roll-out. In appraising the case for lighting, it would be beneficial to obtain data (wind speeds, visibility etc) which would determine the average number of night flights which would be subject to disruption or cancellation.

Global Navigation Satellite Systems (GNSS)

- 3.4.10 The advent of global positioning system (GPS) technology provides a potentially cost-efficient opportunity to extend the operating day and improve reliability on lifeline air routes. Whilst GPS has been around for a considerable length of time, the technology has not been sufficiently advanced for roll-out. However, considerable recent technological advances in Global Navigation Satellite Systems (GNSS) have been made and flight procedures for GNSS instrument approaches are in now in operation at many US airports and an increasing number of airports across Europe and the UK.
- 3.4.11 GNSS systems are aircraft cockpit based system which essentially eliminates the need for costly ground based navigational aids and consequently have a number of cost saving advantages.
- 3.4.12 The UK is in the early stages of adopting and approving GNSS approach procedures. The Skye Air Services Feasibility Study explained that Highlands & Islands Airports Limited (HIAL) are currently undertaking work to prepare and gain approval for GNSS approach procedure for runways at Campbeltown, Barra and Benbecula airports. This could be a significant opportunity for flights to the Outer North Isles and may be more fully commercialised by the time the recommendations in this study move towards implementation.

- 3.4.13 The key issues which would need to be considered are the regulatory requirements surrounding GNSS, particularly the landing tolerances, both for day and night flight and in different weather conditions.

Integrated Operation

- 3.4.14 A further opportunity which could be considered going forward is the potential integration of the operation and management of air and ferry services to the Outer North Isles in the future.

3.5 Constraints

- 3.5.1 Constraints represent the bounds within which a study is undertaken. Constraints can take the form of institutional or legal restrictions or geographic and environmental constraints which can limit the scope for transport improvements. This section considers the specific constraints related to the Outer North Isles routes.

Network-Wide

Operational Constraints – Ferry Service

- 3.5.2 There are a number of constraints on the current ferry service, many of which are driven by a combination of the age of the vessels and crewing requirements.
- 3.5.3 Overall, the three Outer North Isles vessels have proven to be **very reliable** over an extended time period. The vessels can typically operate in winds up to force 8²⁹ on the Beaufort Scale. South-easterly winds present the greatest challenge to Orkney Ferries – strong winds from this direction occasionally means that sailings to Sanday and North Ronaldsay have to travel via the west side of Eday for shelter, adding significantly to journey times. When the weather or forecast goes beyond the above then the conditions of the island pier and the transit area will be taken into consideration before the sailing goes ahead. Sailings may be brought forward, delayed or cancelled altogether. Overall however, the ferry service is highly reliable and the key challenge is often berthing at the destination port in specific wind and weather conditions (discussed for each island below).
- 3.5.4 The current facilities at North Ronaldsay and Papa Westray can only accommodate **lift-on, lift-off (Lo-Lo) traffic**. As a result, any vessel providing a car or freight service to these islands can only do so if it has a derrick onboard for Lo-Lo operations. This acts as a significant constraint when purchasing new vessels, as the incorporation of cranes on ferries is relatively inefficient from a design perspective and can impact on, for example, where the crew accommodation can be located. Unless the constraint presented by the North Ronaldsay and Papa Westray freight service can be addressed through investment, it will confine future options with regards to vessels.
- 3.5.5 The current **vessels, whilst safe and in good working order, are not fully compliant with Maritime & Coastguard Agency (MCA) regulations** and are operating under a number of exemptions which would lapse should new tonnage be procured. The two key considerations in this regard are:
- the crew accommodation on the current vessels is below the waterline – the dispensation provided by the MCA allows the crew to overnight on the vessels a maximum of two nights per week, **limiting overnight berthing on the islands** (as the crew typically live on Orkney Mainland). The ability to overnight on the islands could be a useful benefit for island's whose predominant AM flow is outbound from the island (although note overnight

²⁹ Beaufort Scale Fore 8 is classified as a "Gale" with wind speeds in the range 39-46 mph (34-40 knots). This causes moderately high waves with breaking crests.

berthing on the island would have a negative impact on the time of the first delivery to the island); and

- the vessels fail to meet a number of **disability requirements**, including the width of lanes on the car deck.

3.5.6 Should new tonnage be secured, it will be mandated that the crewing accommodation will have to be above the waterline. This opens up a range of opportunities in terms of overnight berthing on the islands, but also presents a design challenge if the Lo-Lo service on North Ronaldsay and Papa Westray is maintained, as at least two of the vessels would have to also accommodate a lifting derrick.

3.5.7 As part of the consultation, Orkney Ferries explained that the requirement of new tonnage to have wider lanes on the car deck would mean that a vessel of approximately 60 metres length overall (LOA) would be required to replace the current 45m-50m LOA vessels if existing car carrying capacity was to be maintained. Procuring larger vessels would in turn have implications for shoreside infrastructure.

3.5.8 **Crewing issues** present a considerable challenge in the organisation and operation of ferry services. The Working Time Directive states that crew can work a maximum twelve hour day and a maximum of 77 hours a week, which is averaged over the working year (known as an annualised hours contract). The Outer North Isles vessels operate with a single crew – this helps to control costs but effectively acts as a constraint on the extent to which the level of service can be increased. Evidence of this issue can be seen by the extended periods of time during which the vessels appear to tie up in Kirkwall, presumably providing crew rest time, such as (Summer 2014):

- Monday: 13:30-16:00, 12:40-16:20 and 13:55-16:40
- Tuesday: 10:45-16:20
- Wednesday: 14:00-16:00, 14:10-16:20 and 13:20-16:40
- Thursday: 10:55-16:00, 10:25-13:00 and 10:40-15:00
- Friday: 13:30-16:40.

3.5.9 Whilst it can be argued that there would be limited island demand for services during these time windows, the crewing hours regulations present a clear constraint on what can be done within the current operational envelope. **In short, the ferry service is currently operating to its maximum capacity.**

3.5.10 It should be noted that the addition of a (albeit expensive) **second crew or a shift-work system** would offer the opportunity to significantly enhance the overall level of service. However, questions would arise in terms of affordability, demand and labour relations.

Operational Constraints - Air Service

3.5.11 Loganair explained that the two aircraft **are well used and any significant increase in usage would trigger additional crew and might reduce the current fat in the system, which would result in reducing the current ability to recover from weather delays and such like.** The system is very flexible with timetables being changed to work around the weather. Local knowledge networks are used to inform passengers of changes. An increase in flying of say more than 5% would start to cause reliability and recovery problems elsewhere.

- 3.5.12 The aircraft are flown visually and thus **can only operate during the daylight hours (North Ronaldsay being the exception) and are susceptible to fog and low cloud cover.**
- 3.5.13 There are currently three crews based on the Orkney mainland. However, the 1,200 annual flying hours actually require 3.5+ crews to be delivered. This 0.5+ is fulfilled by using some management pilots from elsewhere in Loganair to cover by combining their flying with recurrent training, to cover sickness, holidays and any flight time pinch points. It should be noted that these pilots are not resident and are more highly paid, so **changing the flying requirement will cause a review of how best to cover.** In other words, if say 3.8 pilots were required to cover the programme it might make more sense to recruit another fully dedicated and resident pilot to avoid the costs of using management pilots. That said, Loganair has indicated that even with an increase in locally based flight crew, it is impossible to avoid the cost of management pilots as they also perform essential checks.
- 3.5.14 The engineering system involves each of **the two aircraft having two major checks of one month each throughout the year (essentially four months of deep engineering).** In essence one aircraft covers the summer timetable and two aircraft cover the compressed day of the winter timetable. The checks are planned to permit this. Loganair explained that if there was an increase in aircraft, this would not be constrained by engineers or by available hangarage. However an additional aircraft might well necessitate a significant addition of crew. Such an aircraft could only reasonably be justified if it was worked hard, so it is likely that between 2 – 4 additional crew would be required to ensure it was well used. A six month lead time is required for new crew.
- 3.5.15 **Overall, there appears to be very few opportunities to enhance the current air timetable without additional aircraft. The general lesson is that incremental changes can only work within quite tight limits and then any larger changes spark a bigger systemic response in terms of crewing and aircraft numbers.**

Aircraft

- 3.5.16 **Loganair explained through the consultation that the Britten-Norman Islander is the optimal aircraft for operating the Outer North Isles network.** The only other realistic alternative which could operate within the current infrastructure is the larger Twin Otter aircraft which is used on the Glasgow – Barra route, but these aircraft are more expensive to purchase, and the additional cost of which would be hard to justify given the cost efficient high performance of the Islanders.
- 3.5.17 The only other medium to long-term possibility is the use of a single engine Cessna Caravan 1, which has been approved in the United States and some European countries but is not currently permitted by the UK CAA. Whilst such an aircraft could operate to the islands, the use of a single engine aircraft would likely have acceptability issues and is not an immediately realistic prospect given the current lack of precedent within the UK.

Airfields

- 3.5.18 The airfields open one hour around flights. **Fire cover is minimal with a derogation specially negotiated with the Civil Aviation Authority (CAA),** although a new fire tender is now on order to address this. Part-time staff are used and the Council explained that they are very flexible and amenable. However, there are naturally limits to this flexibility and amenability and **any significant uplift in usage might start to run into airfield manning issues, particularly given the ageing population of the islands.** It seems that pay rates, and the ability to have free time (Sunday working was mentioned as resisted by some staff) are issues.
- 3.5.19 North Ronaldsay has airfield lighting and Loganair explained that this helps the whole system as in winter the rest of the programme can be completed in daylight, leaving the Kirkwall –

North Ronaldsay – Kirkwall shuttle to finish off the day. However, Loganair cautioned that proliferating lighting elsewhere might raise expectations beyond the ability of the system to deliver. Flying into North Ronaldsay at night is under stricter weather limitations than daylight flying and hence more cancellations are likely. Also at night frost and snow are more persistent, whilst in daylight hours these may well have thawed to allow operations. **Lighting cannot therefore be seen as a panacea to accomplish more flying without some operational costs** (an issue explained in more detail earlier in the report).

- 3.5.20 With regard to other technology, **Loganair did not see any realistic benefits from additional ILS or GPS navigation. All flights currently fly under VFR (Visual flight rules), which mean that fog and low cloud are the main inhibitors.** However very strong winds can also cause cancellations. The one innovation welcomed by Loganair was the programme to train airport staff in radio usage as their on the spot advice at a destination can help pilots with hard judgement calls (although this does place more responsibility on the Council staff at the airfields). This programme is underway but not yet universal. Incidentally operational reliability is very high in the system and is complementary with the ferries, as the issues that impede ferries operating are not exactly the same as air service inhibitors (eg sea state).

Fixed Operating Envelope

- 3.5.21 The constraints identified above effectively combine to form the ‘operating envelope’ for the current air and ferry service – ie the maximum operational hours possible with the current assets, including: vessels; ports & harbours; ferry crew; shoreside crew; aircraft; airfields; pilots; and airfield staff.
- 3.5.22 Consultation with Orkney Ferries and Loganair coupled with our own review of operations suggests that **the current Outer North Isles transport network is operating at or near to maximum operating capacity.** As such, any adjustment of the service at the margin to benefit one island will likely disbenefit another island. There may be a case for equalising provision across islands (eg offering Eday a level of connectivity similar to other islands) but service expansion within the current operational envelope would be difficult if not impossible to achieve.
- 3.5.23 **Any expansion of the service will require additional assets and / or crew, an issue discussed in the subsequent chapters.**

Eday

Berthing

- 3.5.24 Berthing at Eday is not normally a problem in reasonably settled conditions. The approach to the jetty is quite shallow from a fairly close distance from the actual berth and there is no opportunity to turn inside this pier unless the tide is quite high.
- 3.5.25 There is a fairly fast flowing tide which changes direction quite quickly on the outside of the pier, meaning that the Master has to use a lot of power on the approach to berth. This is quite an exposed pier from most directions of wind but the worst direction of wind for getting alongside is north-east, where it is difficult to approach the berth keeping full control of the vessel and there is a tendency to get blown on top of a fairly narrow pier end.
- 3.5.26 Any wind above 40 knots would give significant problems whilst berthing. Transiting to Sanday, Stronsay or Eday during south-easterly gales can result in sailing times increasing by anything from an hour to two hours on each leg of the journey due to the route that needs to be taken.
- 3.5.27 The berth at Eday is too exposed for overnight berthing in all but very settled conditions.

North Ronaldsay

Lack of Linkspan

- 3.5.28 The pier at North Ronaldsay does not have a RoRo linkspan and vehicular traffic has to be craned on and off the vessel. This issue means that only the *Earls* can serve North Ronaldsay and that any new vessels would have to have a lifting derrick onboard unless this port and indeed Papa Westray had linkspans installed.

Berthing

- 3.5.29 North Ronaldsay is a challenging berth at the best of times as it is exposed to most directions of the wind. The motion tends to run into the relatively short pier, which gives the Masters some very difficult conditions to berth in. Westerly motion needs ebb tide to hold the motion away from the pier and easterly requires flood tide to hold the sea the other way. Due to a lack of water, berthing is not carried out at less than half tide during the spring tide period.
- 3.5.30 The pier lies north to south, with strong winds from the south-east to the south-west (which is the prevailing wind), the whole pier can be awash and it can sometimes be up to several weeks before a vessel can access the berth.
- 3.5.31 The pier is very sheltered from northerly wind but the challenge is getting there as the North Ronaldsay Firth is full of shallows and there can be very steep seas on the approach from Start Point in Sanday towards the berth. The berth is only 44 metres long and, as the *Earl's* are 45m LOA, this in itself poses a problem as there is nothing to hold the stern properly to, as the rope is leading across, rather than astern where you would want it.
- 3.5.32 As the conditions are generally quite difficult in the winter, considerably heavier mooring wires than would be used at other piers are required and the conditions on the ship and the pier are less than ideal. On the ship there is very little room on deck to use these heavier moorings, and on the pier, with an aging population, it is difficult to recruit persons who are capable of working with these types of moorings and still maintain safety.

Papa Westray

Lack of Linkspan

- 3.5.33 Papa Westray does not have a linkspan, meaning that vehicles and other goods are loaded / offloaded by crane. The lack of Ro-Ro facilities also means that the port can only be served by the MV *Earl Sigurd* and MV *Earl Thorfinn* as the MV *Varagen* does not have a lifting derrick.

Berthing

- 3.5.34 The pier is open construction and the tidal motion runs right through exposing the ship to fairly extreme tidal ranges on short moorings as the pier itself has only about 40 metres of allowable mooring area due to tidal constraints. The berth runs north-east to south-west with very little shelter. Northerly tidal motion runs in around the point during strong to gale force winds making berthing difficult. Strong wind from any southerly direction makes a controlled approach the pier difficult as the construction is of sprung piles, which damages the ship very easily. The end of the pier is very narrow which makes landing on it in all but calm weather very dangerous.

Sanday

Berthing

- 3.5.35 There are no tidal constraints on this berth whilst turning inside. There would be some fairly considerable constraints turning outside this pier due the fast flowing tide going past in both directions. It is possible to berth at this pier in all but extreme conditions from the west where the tidal motion runs overtops the pier making it difficult to moor the ship safely at high water.
- 3.5.36 In terms of operation, winds of over 40 knots from a Westerly direction overtops the pier from about half tide upwards making it difficult for the lines men to secure the vessel's lines. Transiting to Sanday, Stronsay or Eday during south-east gales can result in sailing times increasing by anything from an hour to two hours on each leg of the journey due to the route that needs to be taken.
- 3.5.37 All vessels regularly lay overnight as this Island has no particular constraints in this regard.

Stronsay

Berthing

- 3.5.38 Berthing is possible at this pier in all but extreme conditions but a northerly wind would predominately be the most difficult to moor in. There are some tidal constraints with the approach to the pier, but no particular problems alongside.
- 3.5.39 Stronsay can be a challenge to get to during south-easterly gales as the transit through Sanday Sound is very tidal and shallow setting up a very steep tidal motion during the flood tide. This generally dissipates during the ebb but this is only one section of the passage that gives rise to problems during south-easterly gales. Transiting to Sanday, Stronsay or Eday during south-easterly gales can result in sailing times increasing by anything from an hour to two hours on each leg of the journey due to the route that needs to be taken.
- 3.5.40 All vessels regularly lay overnight as this Island has no particular constraints in this regard.

Westray

Berthing

- 3.5.41 There are no tidal issues at this pier with the present fleet of vessels as they all have the capability of turning inside the berth where there is no significant tide. The direction of wind which poses the most difficulty is south-easterly where the sea breaks over the top of the pier making it a challenge to keep the vessel alongside to get decent moorings ashore and it also makes the lines man on the pier itself vulnerable. Up to about 40 knots of SE wind, it is generally still possible to berth the ship in most tidal ranges. In winds more than 40 knots, an assessment needs to be made on height of the tide ie at low water the ship generally has reasonable shelter in which to berth.
- 3.5.42 The ship can berth here during spells of settled weather and does so during the summer timetable. If the weather breaks then this is not a sheltered berth from most directions as the tidal motion has a tendency to run right into the RoRo berth in certain tidal conditions. The intensity of the tidal motion at the pier means that it is very common to break mooring lines even when tied up for a short time.

4 Objective Setting

4.1 Overview

- 4.1.1 The setting of Transport Planning Objectives is a key step in the STAG process as they define what the policymaker should be seeking to achieve through the transport intervention. The objectives that we have developed for this appraisal are designed to reflect and address the problems, issues, opportunities and constraints outlined above, whilst also focusing on the delivery of the wider policy context and the Scottish Government's Purpose
- 4.1.2 Our initial Transport Planning Objectives are set with the aim of being developed into SMART objectives as the appraisal progresses. That is, the objectives will be:
- **Specific** – they will say in precise terms what is sought;
 - **Measurable** – they will provide a means by which to establish stakeholders' satisfaction as to whether or not the objective has been achieved;
 - **Attainable** – the objectives are set in such a fashion that they will be considered realistic;
 - **Relevant** – the objectives will be a sensible indicator or proxy for the change that is sought; and
 - **Timed** – the objectives will be associated with an agreed future point by which they will have been met.

4.2 Objective Setting

Connectivity and the RSM

- 4.2.1 A conventional STAG approach would set Transport Planning Objectives, based on a set of identified problems and issues from the Pre-Appraisal. However in this case, Transport Scotland's Routes and Services Methodology (RSM) has recently been applied (using a bespoke primary data collection exercise undertaken on the islands), and this has led to the specification of a 'model' level of service provision for each island (in terms of the length of the operating day and the service frequency), designed to meet the needs of the islands based on the characteristics identified. It can therefore be argued that the RSM outcomes encapsulate the problems and issues often identified at the pre-appraisal stage.
- 4.2.2 What does the RSM Study say?
- **Westray, Eday, Stronsay³⁰ and Sanday** should have '*Standard-Limited*' sailings per day (3-5) together with an '*extended*' operating day, defined as 'up to 14 hours (0600-2000)', seven days per week. This implies a total level of connectivity of between 21 and 35 connections to Kirkwall per week for each of these four islands.
- 4.2.3 The '*Standard-Limited*' sailings per day therefore range from three to five ferry departures per day. This in itself is a very wide range, ie the difference between three and five ferry departures per day would have a major impact on the resources required to provide these levels of service.

³⁰ Note that the RSM identified a much lower level of service for Stronsay than is current in place. However, following discussions between the Council and Transport Scotland, it was agreed that it would intuitively be sensible to treat Sanday and Stronsay in the same way (given that they share services) in the option generation stage of the RSM (the role which this study fulfils)

- 4.2.4 Westray currently has 17 ferry departures to Kirkwall per week with Eday, Stronsay and Sanday having 14, figures which are well short of the levels of connectivity implied by the RSM.
- 4.2.5 If the air services are added, the total number of connections increases to 16 (Eday) 26 (Stronsay and Sanday) and 29 (Westray), much more in line with that required by the RSM, with the exception of Eday on 16. However, when applied within the Ferries Review, the RSM did not consider flight connections together with ferry connections so there is no precedent for adding flight connections to ferry connections in this way.
- 4.2.6 At present, the typical operating day for these four islands runs from 0700-0730 to 1900-1930, which is not far short of the 'up to 14 hours' implied by the RSM. However this operating day typically starts and finishes in Kirkwall – from the perspective of the islands, the operating day is much shorter. Arguably, it is this latter measure which is more important. For air services, in summer the operating day typically runs from 0730-1815, but in winter this is somewhat shorter at 0730-1745.
- **Papa Westray** and **North Ronaldsay** should have '*Limited**' sailings per day (ie 1) together with a '*partial*' operating day, defined in the RSM as 'no regular operating day', again seven days per week.
- 4.2.7 At present North Ronaldsay / Papa Westray have very limited ferry connectivity (1-2 per week) but good connectivity by air at 21 / 22 per week respectively.
- 4.2.8 **In this, the length of the operating day implied by the RSM is not currently being met by the ferry or air services.**

Applicability of the RSM

- 4.2.9 The RSM provides a useful measure of ferry service provision to compare services levels across Scotland. However, as currently specified, it is perhaps of only limited applicability to the Outer North Isles due to the interrelationship between the ferry services and the air services. This is even more pronounced in the case of North Ronaldsay and Papa Westray where the majority of the connections are provided by air. Also, other applications of the RSM have typically been in an environment where there is less air connectivity than is the case with the Orkney Outer North Isles.

Alternatives to the RSM

- 4.2.10 It would also be possible to set Transport Planning Objectives independently of the RSM process, as per the STAG convention. These could for example include:
- all of the Outer North Isles should have an identical level of service and connectivity to Kirkwall, and see at least an equal level of service to elsewhere in Scotland;
 - the level of connectivity of each island to Kirkwall should be a reflection of the population of the island with the most populous islands receiving the highest level of connectivity;
 - when necessary, school children from each island should be able to travel to and return from Kirkwall Grammar School on the same day, or at the very least have a three night weekend at home;
 - it should be possible to travel from each island to Kirkwall on each weekday to allow a conventional 9 to 5 working day;

- ensure that island's freight / exports / supply chain needs are fully met and not inhibited by lack of capacity or connectivity;
- ensure that the islands' tourism based economies are not inhibited by lack of capacity, and also by the capability to changeover; and / or
- ensure that islanders have sufficient connectivity to the mainland for access to public services, health, shopping etc.

4.2.11 In fact, most of these parameters are already encapsulated implicitly in the RSM. **As such, we propose to use the levels of connectivity implied by the RSM as a means to setting objectives for this STAG study.**

Capacity

4.2.12 The RSM is primarily concerned with connectivity but a further key issue here is capacity. In common with other ferry services, the Outer North Isles ferries rarely have any issues with passenger capacity, although many of the more popular sailings reportedly depart with their vehicle deck at capacity. Passenger capacity on the air services is much more limited, with each aircraft having a capacity of eight compared to 142 or 190 per ferry.

4.2.13 It has been seen that over 92% of passenger journeys from Eday / Stronsay / Sanday / Westray are undertaken by ferry. However, the ferry also provides around 95% of the available capacity for passenger movements from the four islands. This was also reflected in the islander survey results, where for example, 87% of Sanday respondents used the ferry at least 1-2 times per month. The equivalent figure for the air service was only 10%.

4.2.14 The key issue here is the extent to which the lack of air capacity (or perceived lack of availability) determines the ferry / air choice made by islanders, given that journey times are so much shorter and fares levels do not appear to be prohibitive.

4.2.15 **A key point to be explored during any further consultation would therefore be the appetite amongst islanders to make more use of air services (in addition to or as an alternative to the ferry service) if significant new capacity was to be provided, ie the capacity constraint was to be removed.**

4.3 Proposed Objectives

4.3.1 In the light of the above discussion, assuming that it is accepted that the RSM findings should form the basis of the objectives here, there are two broad alternative approaches:

- **Approach 1:** Provide the levels of connectivity based on the outcomes of the RSM by **ferry only**; or
- **Approach 2:** Provide the levels of connectivity based on the outcomes of the RSM by a **combination of ferry and air** services.

4.3.2 In the case of Approach 1, this solution is likely to be high cost (given the implied increase in tonnage required), and may not meet the needs of the islanders as it would exclude consideration of the air services which are a key component of the current Outer Isles Transport Services. **This approach is not recommended.**

4.3.3 With Approach 2, it is noted that a number of flights across the week are capacity constrained due to the regular carrying of school children, teachers, health workers, bank staff etc. It is therefore worth defining '**effective connectivity**' as being the number of connections which

are not currently constrained in this way. These 'effective connections' would become the benchmark for measuring connectivity, ie the capacity constrained flights would be excluded.

4.3.4 In addition, if Approach 2 was to be followed, the upper end of the range (3-5) of connectivity implied by the RSM could be targeted, since any new flight would still offer only limited capacity and therefore uncertain connectivity. Any connectivity solution must therefore provide sufficient capacity for passengers, cars and goods.

4.3.5 Any STAG Part 1 study is also concerned with the STAG criteria:

- Environment;
- Economy;
- Accessibility and Social Inclusion;
- Safety;
- Integration;

in addition to:

- Established Policy Directives; and
- Feasibility, Affordability; and Public Acceptability.

4.3.6 In practice, these criteria will account for all the key factors which are likely to distinguish between the different options for meeting the targeted levels of connectivity for the Outer North Isles.

5 Option Development

5.1 Overview

- 5.1.1 This chapter sets out the options for the short, medium and long-term options for transport services to the Outer North Isles. This is a strategic study in its truest sense and it is important to ensure that the disparate options are closely coordinated to ensure consistency over time – for example, within the wider transport mix, there are options for air and ferry services, harbour locations and, potentially, fixed links.
- 5.1.2 This chapter will set out the short and long-term options we have identified.

5.2 Option Generation

- 5.2.1 Having identified the key problems, issues, opportunities and constraints, it is now possible to establish a wide range of options for the future transport provision to the Outer North Isles. The STAG Guidance explains that the ‘Option Generation, Sifting and Development’ stage of the appraisal encourages the derivation of a range of options that should provide the solution(s) to meet the Transport Planning Objectives and alleviate the problems or address the opportunities identified.
- 5.2.2 In line with the STAG philosophy, the initial options generated reflect the full range of possibilities available and are not unnecessarily constrained - the potential options for the network were derived through:
- ideas / outputs from the consultation and participation process;
 - ideas / proposals that have previously been developed and remain viable options; and
 - ideas / outputs from structured decision making processes followed by our team undertaking the transport planning exercise (team brainstorming).

5.3 Short-Term Options

Short-Term Options

- 5.3.1 As well as considering the strategic direction of transport investment for the Outer North Isles, the study brief sought a review of short-term options for improvement to the current service. In line with the principles of STAG, we have conducted an unconstrained optioneering exercise, developed through consultation with Officers, Orkney Ferries, Loganair and the Council’s Health and Education Departments.
- 5.3.2 It is important to note that the short-term options developed are those which could be achieved **within the current operating envelope** – ie with the current vessels, aircraft and landside infrastructure. The only potential service change which we have considered in the short-term is the potential addition of ferry crew, as this is a measure which could be introduced, albeit acknowledging that it would require a change to current working practices and availability of seagoing crew.
- 5.3.3 *It should also be noted that our discussions with Orkney Ferries and Loganair has suggested that the current assets are operating near or indeed at their current operating capacity. Therefore, any change in the level of service to one island will necessarily result in a reduction to the level of service to another island.*

5.3.4 The following short-term options were identified, although further detailed consultations with the air and ferry operating companies will be required to ensure operational feasibility.

Option ST1: Realign current timetable to provide each island with alternative day air and ferry services

- Each island would have an alternative day air & ferry service, with an enhanced service on one mode being offset by a reduced frequency on the other on alternating days.
- Each island would have at least one departure on either mode in the AM, inter-peak or PM.
- Each island would have a minimum of one return flight per day.
- North Ronaldsay and Papa Westray would be exempt from this option given their limited ferry infrastructure and long-crossing times.

Option ST2: Add an additional crew or introduce a shift-work system on one or more of the ferries to provide a progressively extended operating day

- This would provide evening sailings and would allow for an extended period in Kirkwall.
- However, the cost would be significant and there could be contractual / labour relations issues with introducing a shift-work system.

Option ST3: The first and last sailing from an island will always be direct to and from Kirkwall

- This option would reduce the disincentive to use the ferry caused by the extended journey times on indirect sailings.
- However, the overall number of sailings operated would reduce and the timing of the first outbound sailing could be late morning or early afternoon.

Option ST4: Discontinue all indirect sailings

- This option would reduce the disincentive to use the ferry caused by the extended journey times on indirect sailings.
- However, there would be a significant reduction in the overall number of sailings operated from each island.

Option ST5: Work towards 'clockface timetabling' on air and ferry services

- Offers a more regular and 'typical' public transport connection.
- However, very challenging to operate within current operational envelope.

Option ST6: Increase the number of calls to North Ronaldsay and Papa Westray

- Each return sailing to these islands significantly diminishes the total number of sailings across all islands.

Option ST7: Increase the overall level of service to Eday so as to ensure it is comparable with the other islands

- This would increase the total weekly departures to Kirkwall from 17 to a minimum of 20-22.
- There would be a knock-on reduction in services to Sanday, Stronsay and Westray.

Option ST8: Facilitate a three night weekend for school children resident in the islands by offering a Monday morning ferry or flight from each island to Kirkwall

- This option could assist in promoting the sustainability of the islands by making them a more attractive place to live.
- However, it would have wider impacts on the timetable for both island and mainland communities and potentially on the time of the first and last sailings / flights.

Option ST9: Develop an integrated air and ferries fares policy which support demand management

- This option would allow for the smoothing of peak demand on busy flights in particular.

Option ST10: Stagger the vessel operating day start times to achieve a longer operating day

- The three vessels could adopt a staggered operating day, eg 0500-1700, 0700-1900 and 0900-2100.

5.4 Medium & Longer Term Option Themes

- 5.4.1 In order to meet the connectivity objectives, there are a range of potential broad options which could be adopted and these are discussed further below.

New Aircraft / Upgraded Airstrips

- Replacement aircraft – like for like
- Replacement aircraft – larger than current
- Additional aircraft – as per current
- Additional aircraft – larger than current
- Airstrip infrastructure – navigational aids GNSS / ILS
- Airstrip infrastructure – lighting
- Airstrip infrastructure – asphaltting of landing strips

Issues associated

- The current aircraft have a very low capacity, but the move to larger aircraft would require significant landside investment at the airstrips, including land purchase and asphaltting of the runways.
- Consultations to date have suggested that the Britten Normen Islander is the most appropriate aircraft to run these services.
- Any additional aircraft flying its full hours requires 3.8 crew – there may be recruitment issues locally.
- Of the islands, only North Ronaldsay has the capability for non-daylight flying at present.
- Helicopters are not suitable aircraft for this service due to cost.

New Vessels

- Replacement of life expired ferries on a broadly like for like basis – size
- Replacement of life expired ferries on a broadly like-for-like basis - capacity
- Replacement of life expired ferries with larger vessels
- Deployment of additional ferries on a broadly like for like basis
- Deployment of additional larger ferries
- Deployment of foot passenger only ferries
- Deployment of freight only vessels

Issues Associated

- Current harbour infrastructure / berths are sufficient for the current size (length) of vessels, although only just so in some cases;
- New regulations mean that longer vessels will be required to accommodate the same number of cars, there is a requirement to allow a gap of 1 metre around the perimeter of vehicles to allow access for people with disabilities;
- No sailing by sailing data on car carryings currently available but anecdotally the first sailing from and the last sailing to each island often sail with a full car deck;
- A freight only vessel can take a number of forms, a true Lo-Lo vessel has no ramp and no drive through facility, these are much cheaper to acquire and operate and would have a very low passenger certification; and
- If a Lo-Lo vessel was acquired for use in North Ronaldsay and Papa Westray, would there be any demand for its use elsewhere on the network?

Harbour Infrastructure

- Pier extensions to accommodate larger vessels
- Installation of linkspans at North Ronaldsay and Papa Westray to accommodate Ro-Ro vessels
- Harbour improvements / weatherproofing to allow overnight berthing at the islands
- Relocations of island harbours (Stronsay, Eday, Shapinsay)
- New infrastructure to accommodate RoPax on Westray-Papa Westray

Issues Arising

- Any move to longer vessels will require pier extensions at a number of ports;
- At present it is not possible for more than one vessel to berth at any of the Outer North Isles at the same time; and
- there are also tidal restrictions at North Ronaldsay.

Fixed Links

5.4.2 Fixed links have the potential to re-draw the map in terms of connectivity, and as such determine the specification of the resulting air and ferry services and the number of aircraft / vessels required. Fixed links have in the past been proposed / considered for the following:

- Papa Westray to Westray

- Westray to Eday
- Kirkwall to Shapinsay (with a new ferry terminal at Shapinsay forming a hub for Outer Isles services)

Issues Arising

- the extent to which the fixed link will reduce the number of ferries required across the network, or allow ferries and aircraft to be redeployed to improve connections elsewhere;
- construction cost;
- environmental issues; and
- impact on existing sea lanes.

5.4.3 It is worth noting at this stage that the Council has recently decided to consult on fixed links.

New Ferry Connections

- Ro-Pax operation between Papa Westray and Westray

Issues Arising

- Requirement for harbour works.

Eday Hub

5.4.4 An Eday hub has been suggested in the past as a means of providing all services to the Outer North Isles. All services would be routed via Eday with a frequent Eday – Kirkwall connection.

Issues Arising

- Harbour at Eday would be relocated;
- Large new harbour capable of accommodating multiple vessels at Eday would be required; and
- All routes may require to change vessel at Eday.

5.5 Procurement

5.5.1 There are a number of procurement and institutional factors which can influence the way in which the connectivity objectives can be met, primarily concerning procurement of vessels / aircraft and the funding of capital investment. These can perhaps be thought of as a **means to an end at this stage though**. For example, any extension of tendering into the Orkney internal ferry network would be based on a specification and this specification would reflect the outcomes sought. This is explored further in the chapter which follows.

6 Short-Term Option Appraisal and STAG Part 1 Appraisal

6.1 Overview

- 6.1.1 This section involves in the initial appraisal of the options identified in Chapter 5. It consists of two parts:
- an appraisal of the short-term options in terms of their public acceptability, deliverability and affordability; and
 - a STAG Part 1 Appraisal of the medium to long-term options.

6.2 Short-Term Options

- 6.2.1 The short-term options identified in Chapter 5 are focussed on what can be achieved within the current operating envelope (in terms of capital assets). The key point of note here is that consultation suggests the current air and ferry service is operating at or near its operational maximum, certainly as far as the peak times of the day are concerned. Therefore, with the exception of adding additional crew, any change in the service pattern is at best a zero sum game in terms of the number of services offered.
- 6.2.2 With this in mind, we have not compared the short-term options against the objectives (because there would be no improvement in the level of service) or the STAG criteria (because there would be little or no network-wide net benefit from an operational reshuffle). We have instead explored the specifics of each option, setting out the likely position in terms of public acceptability, deliverability and affordability. We would recommend that this initial review takes advantage of any STAG Part 2 consultation to verify the views of the public on these options.

Option ST1: Realign current timetable to provide each island with alternative day air and ferry services

- 6.2.3 Under this option, each island would have an alternative day air and ferry service, with an enhanced service on one mode being offset by a reduced frequency on the other on alternating days. Each island would have at least one departure on either mode in the AM, inter-peak or PM as well as a minimum of one return flight to Kirkwall per day. North Ronaldsay and Papa Westray would be exempt from this option given their limited ferry infrastructure and long-crossing times.
- 6.2.4 The benefit of this option is that it arguably better aligns the level of service with the propensity to travel. The RSM survey found that across the Outer North Isles, trips by all purposes are infrequent. Therefore, by ensuring a higher level of service on certain days of the week, people could build their plans around this and benefit from enhanced travel options on certain days when they visit the Orkney mainland. The minimum of one return flight per day would also offer a means of travelling to and from the mainland for any emergency appointments.
- 6.2.5 Whilst there is some logic to this option, consultation with the Council, Orkney Ferries, Loganair and the island transport representatives highlighted a series of problems with it. The most obvious issue is that there would be significant disagreement on which day islands should get a given level of service. This is particularly the case with the ferry which is less flexible in terms of deployment and at the same time responsible for the bulk of an island's freight needs. Examples of the types of disagreement which could emerge include who

benefits from having a ferry service on stock day (Mondays) or the needs of some island businesses, the bakery on Westray for example, to receive a daily service.

- 6.2.6 In addition, the guaranteed return air service per day for each island would have to be accommodated within the wider requirements of the Council's education and health departments, as well maintaining the current position in North Ronaldsay and Papa Westray. There would therefore be significant questions over whether such a service could be maintained.
- 6.2.7 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	xx	The lack of connectivity on alternate days coupled with the supply chain impacts means that this option is likely to be unacceptable to the public.
Deliverability	x	The requirement for a minimum of one return air service per day coupled with maintaining the current service levels to North Ronaldsay and Papa Westray presents some deliverability challenges.
Affordability	o	This option would be cost neutral.

- 6.2.8 *Based on the above analysis and scoring against criteria, we would recommend that this option is not considered further.*

Option ST2: Add an additional crew or introduce a shift-work system on one or more of the ferries to provide a progressively extended operating day

- 6.2.9 Option ST2 would involve adding an additional crew to one or more vessels or introducing a shift-work system with a view to progressively extending the operating day in line with the RSM targets. At present, all three vessels tie up in Kirkwall for periods during the afternoon on different days of the week, a practice which is required to ensure the current service can be offered within the constraints of a single crew operation (although this also reflects low demand during this time).
- 6.2.10 The key benefit of this option is that it would offer an extended sailing day and allow for at least some working-day or evening time in Kirkwall. The accessibility benefits to the islands could be significant.
- 6.2.11 However, there are a number of challenges with this option. Firstly, adding one or more additional crews would result in a step-change in operating costs. Orkney Ferries has also indicated that the demand for inter-peak and later evening sailings would be relatively low, meaning a significant increase in crewing and operational costs for only a marginal benefit.
- 6.2.12 It is also highly likely that moving to a shift-work system would give rise to contractual issues with the current workforce.
- 6.2.13 Finally, Orkney Ferries explained that a number of the island berths can be challenging to access in darkness so extending the operating day brings some operational challenges outwith crewing issues.

6.2.14 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	✓✓✓	The extended operating day and improved travel choices would be highly acceptable to island communities.
Deliverability	xx	There are a number of deliverability challenges with this option, including crewing issues, labour relations and the lack of accommodation on the vessels.
Affordability	xxx	This option would give rise to a step change in the cost of operation.

6.2.15 *Whilst an attractive option in terms of the improvement in the level of service, we would recommend not considering this option further given the deliverability and affordability issues. However, it should perhaps be revisited as part of the realisation of the medium to long-term strategy for the Outer North Isles.*

Option ST3: The first and last sailing from an island will always be direct to and from Kirkwall

6.2.16 This option acknowledges the journey time implications of indirect sailings, particularly at the start and end of the business day. Under this option, the first and last sailing to / from each island would be direct to / from Kirkwall.

6.2.17 The main benefit of this option is that it would reduce the disincentive to use the ferry caused by long indirect sailings. Whilst this would offer minor benefits to the islands, the fixed operating envelope means that the overall number of connections would be reduced, whilst inter-island connectivity would also suffer. It would also mean that the timing of the first and last sailing could also be late morning or early afternoon, which curtails the benefits offered by this option.

6.2.18 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	xx	This option would be seen as unacceptable given the limited benefits and the overall diminution in island-mainland and island-island service levels.
Deliverability	o	There are only three vessels to serve four islands (excluding Papa Westray and North Ronaldsay) which means one of the four would have a very late first sailing under this scenario.
Affordability	o	This option would be cost neutral.

6.2.19 *Based on the above analysis and scoring against criteria, we would recommend that this option is not considered further.*

Option ST4: Discontinue all indirect sailings

6.2.20 This option would make all ferry services between Kirkwall and the Outer North Isles direct, removing the often lengthy diversion via other islands. This option would clearly reduce the disincentive to use the ferry caused by the extended journey times on indirect sailings. However, there would be a significant diminution in the overall level of service, damaging the connectivity of the islands.

6.2.21 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	xxx	This option would be highly unpopular in the islands given the reduction in overall connectivity across the network.
Deliverability	o	There would be no deliverability issues
Affordability	o	This option would be cost neutral.

6.2.22 *Based on the above analysis and scoring against criteria, we would recommend that this option is not considered further.*

Option ST5: Work towards 'clockface timetabling' on air and ferry services

6.2.23 This option involves re-timetabling services to offer 'clockface timetabling' on the network – ie all ferries and flights leave at a regular time each day. This is a common practice in public transport planning and makes it easier for users of the service.

6.2.24 However, given the operational complexity of the network, it is unlikely that a more robust timetable than that which currently exists can be offered. Indeed, a review of the air and ferry timetables identifies a service pattern as near to clockface as is likely possible.

6.2.25 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	✓✓✓	This option would be acceptable as it is consistent with best practice in public transport planning.
Deliverability	xxx	This option, in its truest form, would be very challenging to deliver given the constraints in the network.
Affordability	o	This option would be cost neutral.

6.2.26 *Clockface timetabling should be retained as a broad principle in developing the future shape of the network. At the same time, however, the deliverability issues must be acknowledged.*

Option ST6: Increase the number of calls to North Ronaldsay and Papa Westray

6.2.27 This option acknowledges the currently very limited ferry service offered to North Ronaldsay and Papa Westray and would seek to enhance the service to a daily call in line with the RSM.

6.2.28 Whilst this option would be popular in North Ronaldsay and Papa Westray and would support the economy of those islands, there would be a very significant diminution of service across the other four islands. Given the quality of the air service to the North Ronaldsay and Papa Westray, the limited harbour facilities and the length of the crossing, it is difficult to see much in the way of an advantage with this option. In addition, it is likely, although not mandatory, that the air service to these would be reduced and shared around the other islands.

6.2.29 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	xx	Whilst popular in North Ronaldsay and Papa Westray, this option would lead to a significant reduction in connectivity elsewhere and would not be publicly acceptable without a redistribution of the air services (at the very least).
Deliverability	o	This option would be challenging to deliver given the tidal and operational conditions surrounding North Ronaldsay in particular.
Affordability	o	This option would be cost neutral.

6.2.30 *Based on the above analysis and scoring against criteria, we would recommend that this option is not considered further.*

Option ST7: Increase the overall level of service to Eday so as to ensure it is comparable with the other islands

6.2.31 The Pre-Appraisal Report identified the inequitable distribution of services across the islands. Eday in particular suffers from this – the island has a total of 16 connections per week compared to 21-29 across the other islands. This option would aim to increase the level of service to Eday bringing it in line with the other Outer North Isles.

6.2.32 It can be argued that there is a strong case for considering this option further. The current distribution of services is clearly inequitable, and there is no apparent reason for Eday's poorer level of service overall. Clearly, pursuing this option would lead to a potential reduction in the level of service to other islands, an important issue on which to consult.

6.2.33 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public	✓✓✓	This option would be popular in Eday (the three ticks) but generally

Acceptability	& ×	unpopular elsewhere (the one cross). The 'ticks' exceed the 'crosses' in this instance because the benefits would all accrue to Eday residents, whilst the disbenefits would be more evenly spread across the other islands
Deliverability	o	There would be no deliverability issues.
Affordability	o	This option would be cost neutral.

6.2.34 *Given the clearly inequitable situation currently, this option should be retained and subjected to community consultation.*

Option ST8: Facilitate a three night weekend for school children resident in the islands by offering a Monday morning ferry or flight from each island to Kirkwall

6.2.35 A key issue on the islands currently is that children who go to school on the mainland often travel home on a Friday afternoon, but have to travel back to Kirkwall on a Sunday evening, as there is no morning flight or ferry that would get them to school on time. The Sunday travelling requirement is currently as follows:

- Eday – 5 children travel on the 18:25 ex-Eday ferry;
- Papa Westray – 2 children travel on the 15:51 flight ex-Papa Westray;
- Sanday – 19 children travel on the 17:55 ex-Sanday ferry;
- Stronsay – 27 children travel on the 17:45 ex-Stronsay ferry; and
- Westray – 11 children travel on the 18:35 ex-Westray ferry.

6.2.36 This option recommends a redesign of the timetable to ensure that there is a Monday morning service from each island to Kirkwall which would get the children to school on time. Given the number of children travelling from Sanday, Stronsay and Westray, it is likely that this service would need to be provided in part at least by ferry. The current Monday morning flight from Eday also lacks the capacity to handle a further five children.

6.2.37 The benefit of this option is that allowing a full weekend in the islands for school children could support the sustainability of the islands and encourage families to locate there.

6.2.38 The challenge is delivering this option with the currently available infrastructure. As explained above, it is likely that Eday, Sanday, Stronsay and Westray would all require a ferry service which, with only three vessels, would require at least one indirect sailing. The vessels would also need to depart early in the morning, which would reduce the length of the operating day at the other end. This is particularly the case given the vessels can only berth overnight in the islands two nights per week. If Sunday was not one of these nights, the first departure from Kirkwall would likely need to be around 5am. This could also have a negative impact on inbound supply chains, with the first arrival into the island from the mainland being late morning / early afternoon when the vessel starts from the island.

6.2.39 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	✓	The island communities would likely welcome the three night weekend but would have concerns over the timing of the first sailing, the impact on the timing of the last sailing and the effect on the supply chain.
Deliverability	×	The deliverability of this option would present certain challenges in terms of overnight berthing and the departure time of the first sailing, given current working practices.
Affordability	0	This option would be cost neutral unless there is a wage premium for sailing before a certain time in the morning.

6.2.40 *Whilst this option clearly presents a number of challenges, we would recommend that it is considered in more detail, or planned for in future services. This would be an important issue to consult on.*

Option ST9: Develop an integrated air and ferries fares policy which support demand management

6.2.41 A lack of capacity on flights has been cited as a key transport issue for the Outer North Isles. One potential means of managing this capacity issue is through an integrated air and ferries fares policy which promotes demand management measures. This option would allow for the smoothing of peak demand on busy flights in particular.

6.2.42 In discussions with the Council, they have indicated that their preference would be for 'trough pricing' (ie reducing fares on quiet flights / sailings) rather than peak pricing (ie increasing fares on busy flights / sailings).

6.2.43 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	✓✓	This option, if based on trough pricing, would likely be acceptable to the public as it would offer a financial incentive to travel off-peak and could assist in managing capacity at peak times.
Deliverability	✓✓	This option would be relatively easier to deliver although it would require coordination between Orkney Ferries and Loganair.
Affordability	×	There would likely be a cost to this option as reduced fares would in all likelihood require an increase in subsidy to cover the revenue shortfall. This will depend on the elasticity of demand for travel on each mode.

6.2.44 *This option should be considered in more detail going forward – capacity has been identified as a constraint on a number of air and ferry (car deck) services and a policy to proactively manage this constraint should be seen as a key element of the long-term transport plan for the Outer North Isles.*

Option ST10: Stagger the vessel operating day start times to achieve a longer operating day

- 6.2.45 As has previously been noted, the three vessels tend to tie up in Kirkwall for a period in the afternoon, meaning that inter-peak ferry connections are relatively limited. This option involves staggering the operating day start times of each vessel to achieve a longer overall operating day, whilst maintaining the current number of connections. An example of this could be a staggered operating day of the form: vessel 1, 0500-1700; vessel 2, 0700-1900; and vessel 3, 0900-2100.
- 6.2.46 There are considerable merits to this option in that it offers a continuous operating day and removes the afternoon dead time from the timetable. The disadvantage with this option is that it will extend the time between sailings and may concentrate some services in quieter periods of the day.
- 6.2.47 The table below shows how this option scores in terms of public acceptability, deliverability and affordability:

Criterion		Comment
Public Acceptability	✓	The continuous operating day would likely be acceptable to the public, although there may be specific concerns surrounding the increased headway between sailings.
Deliverability	×	The potential contractual issues associated with this change in working practices could be problematic.
Affordability	o	This option would be cost neutral unless there is a wage premium for sailing before a certain time in the morning.

- 6.2.48 *This option should be considered in more detail going forward – an extended operating day (albeit with the same number of sailings) may be of value to the Outer North Isles communities and should be consulted on.*

Summary

- 6.2.49 The above section has set out the potential short-term options which could be pursued within the current operating envelope. It is clear from the analysis that the current service is constrained by a series of variables including operating conditions, crewing and demand. As a result, there is little that can be done in the short-term which would bring about a marked improvement to the current level of service. However some measures could potentially be implemented which may bring about some improvement.
- 6.2.50 Of the short-term options, we would recommend that the following should be the subject of in-principle community consultation:
- Option ST7 – Increase the overall level of service to Eday so as to ensure it is comparable with the other islands (although acknowledging this would have a knock-on impact on the level of service to other islands);
 - Option ST8 – Facilitate a three night weekend for school children resident in the islands by offering a Monday morning ferry or flight from each island to Kirkwall; and

- Option ST10 - Stagger the vessel operating day start times to achieve a longer operating day.

6.2.51 Option ST9, the introduction of an integrated air & ferries fares and demand management policy, should be considered in more detail going forward, whilst clockface timetabling should remain an in-principle commitment for future service planning.

6.2.52 We would also recommend that Option ST2, the addition of more crew or the introduction of a shift-work system, should be considered in the longer-term development of the network. Such an option may become more practical as new live-aboard vessels are secured.

6.3 STAG Part 1 Appraisal – Medium to Long-Term Options

6.3.1 This section provides a high level Part 1 Appraisal of the options developed in Chapter 5.

Do Nothing / Do Minimum Options

6.3.2 The RSM as applied to the Orkney Outer North Isles has identified insufficient provision in terms of number of sailings / connections and the length of the operating day. Car deck capacity on the ferries and the availability of seating on aircraft has also been highlighted as an issue.

6.3.3 The ‘**Do Nothing**’ option is therefore not acceptable as the current ferries will be life expired in the near future and will eventually become uneconomic to continue to run.

6.3.4 A ‘**Do Minimum**’ option of replacing all of the aircraft and ferries on a like for like basis is also not acceptable as there will be only marginal impacts, if any, on connectivity / capacity / operating day.

Other Options

6.3.5 Most of the option themes developed in the ‘long list’ in Chapter 5 are options in their own right, ie they contribute directly to meeting the objectives. However, others are not an option in isolation but are required to enable one of the main options. These are defined below as ‘key enablers’ and are therefore not considered specifically in appraisal tables which follow.

Table 6.1: Option Themes and Key Enablers

Option Theme	Key Enabler
Larger Ferries	Berth improvements / expansions at Eday, Stronsay and North Ronaldsay (where the current berth lengths 60m, 60m and 44m respectively) – the previous STAG work suggested that modifications would be required at all Outer Isles ferry terminals, but this would depend on vessel size
Larger Aircraft	Asphalting of runways Navigational aids
Improved air service reliability (poor visibility)	Navigational aids
Extended air operating day	Runway Lighting Navigational aids
RoPax services to North Ronaldsay and Papa Westray to / from Kirkwall.	New linkspans at Papa Westray and North Ronaldsay

Option Theme	Key Enabler
RoPax services from Papa Westray to Westray	Hard ramps at both ports and procurement of suitable vessel
Kirkwall-Shapinsay Fixed Link / Shapinsay land bridge	New harbour in north of Shapinsay

6.3.6 The following table considers each of the remaining individual options (split into three groups: air, ferry and fixed link) identified previously with reference to:

- Public Implications – what would this change mean for the travelling public?
- Operational Implications – what would this mean for the operation of the services?
- Infrastructure implications – what new or improved infrastructure would be required?
- Costs and resources – main capital and operating cost implications?
- Impact on RSM targets – to what extent would each option increase connectivity, capacity and the length of the operating day?

6.3.7 If an option does not, in its own right, contribute materially to meeting the RSM targets, it can be discounted and not taken forward at this stage.

6.3.8 However, it could still potentially form part of a wider package of options at a later stage.

Table 6.2: Initial Appraisal of Options

	Public Implications	Operational Implications	Infrastructure Implications	Costs and Resources	Impact on RSM Targets	Take Forward
Proposal - AIR						
Replacement Aircraft – like for like	- None	- None	- None	- Replacement costs of aircraft	- None	↔ No additional connectivity
Replacement Aircraft – larger than current	- Higher capacity on all flights - Limited impact on overall number of flights	- Larger aircraft (assumed turbine driven) would require longer turnaround time than Britten Islanders, as they need to cool before restart	- Would require major investment at all Outer Isles airstrips – at least asphaltting of runways and potentially navigational aids	- Higher replacement cost - Airfield upgrades	- Would increase effective connectivity somewhat by removing capacity restrictions on some flights which are currently capacity constrained - Longer turnaround times may reduce number of connections possible per day (depending on existing 'down' time)	✓
Additional Aircraft – like for like	- Public would see additional flights and modest increased capacity	- None	- None	- Additional aircraft purchase - Additional operating costs, particularly in terms of pilot costs	- Would increase effective capacity by adding many new flights and reducing capacity restrictions on some flights by spreading the load, eg an additional aircraft would double the number of summer connections across the network	✓
Additional Aircraft – larger than current	- Public would see additional flights and increased capacity on existing flights	- Larger aircraft(assumed turbine driven) would require longer turnaround time than Britten Islanders, as they to cool before restart	- Would require major investment at all Outer Isles airstrips – at least asphaltting of runways and potentially navigational aids	- Higher additional aircraft purchase - Airfield upgrades - Additional operating costs, particularly in terms of pilot costs	- Would increase effective capacity by adding many new flights and reducing capacity restrictions on all flights by adding capacity and spreading the load, eg an additional aircraft would double the number of summer connections	✓

	Public Implications	Operational Implications	Infrastructure Implications	Costs and Resources	Impact on RSM Targets	Take Forward
Night flying to extend the operating day	<ul style="list-style-type: none"> - Facilitates working day in Kirkwall - Would add flexibility to all journeys to Kirkwall 	<ul style="list-style-type: none"> - Longer operating day would require additional aircraft or potentially 'split shift' style operation 	<ul style="list-style-type: none"> - Airstrip lighting and potentially other navigational aids 	<ul style="list-style-type: none"> - Infrastructure costs - Potential costs of additional aircraft 	<ul style="list-style-type: none"> - A longer operating day would have a direct impact on RSM objectives, particularly if combined with an additional aircraft to double the connections possible - Flights do add only limited capacity though 	✓
Proposal - FERRY						
3 * replacement ferries – broadly like for like size	<ul style="list-style-type: none"> - New vessels would be more comfortable and better equipped - Improved physical access - Journey times may be reduced if new vessels are faster 	<ul style="list-style-type: none"> - Vessels of similar size may have a reduced car deck capacity relative to now due to new regulations (1m perimeter) 	<ul style="list-style-type: none"> - None 	<ul style="list-style-type: none"> - Capital cost of new ferries 	<ul style="list-style-type: none"> - Potential marginal improvement if new vessels were faster, ie more connections may be possible in a given operating day - Improvement may be offset by reduced car deck capacity 	<p>↔</p> <p>Does not provide sufficient additional connectivity / capacity</p>
3 * replacement ferries – like for like capacity (would need to be larger vessels to meet new MCA regulations)	<ul style="list-style-type: none"> - New vessels would be more comfortable and better equipped - Improved physical access - Journey times may be reduced if new vessels are faster 	<ul style="list-style-type: none"> - Vessel replacement with like-for-like capacity would offer an equivalent level of service to that currently in place. 	<ul style="list-style-type: none"> - Harbour improvements if longer vessels are necessary 	<ul style="list-style-type: none"> - Higher capital cost of new larger ferries - Harbour improvement costs to accommodate larger vessels 	<ul style="list-style-type: none"> - Potential improvement if new vessels were faster, ie more connections may be possible in a given operating day 	<p>↔</p> <p>Does not provide sufficient additional connectivity / capacity</p>
3 * Replacement ferries – larger than current ferries (longer LOA)	<ul style="list-style-type: none"> - New vessels would be more comfortable and better equipped - Improved physical access - Journey times may be reduced if new vessels are faster 	<ul style="list-style-type: none"> - Allied harbour improvements may allow vessels to berth overnight on a regular basis - Better seakeeping of larger vessels may improve reliability 	<ul style="list-style-type: none"> - Harbour improvements if longer vessels are necessary – North Ronaldsay, Stronsay, Eday and potentially others 	<ul style="list-style-type: none"> - Higher capital cost of new larger ferries - Harbour improvement costs to accommodate larger vessels 	<ul style="list-style-type: none"> - Potential improvement if new vessels were faster, ie more connections may be possible in a given operating day - Potential increase in car deck capacity relative to today depending on vessel size 	✓
Deployment of additional ferries – size broadly like for like (assuming current fleet is retained / replaced)	<ul style="list-style-type: none"> - New vessels would be more comfortable and better equipped - Additional vessels will allow new services and potentially a longer operating day - Improved physical access - Journey times may be reduced if new vessels are faster 	<ul style="list-style-type: none"> - Vessels of similar size may have a reduced car deck capacity relative to now due to new regulations 	<ul style="list-style-type: none"> - None 	<ul style="list-style-type: none"> - Maintenance of existing vessels or purchase of multiple new vessels - Purchase of additional ferry 	<ul style="list-style-type: none"> - Additional vessel(s) would improve connectivity by providing additional services and potentially facilitating a longer operating day 	✓

	Public Implications	Operational Implications	Infrastructure Implications	Costs and Resources	Impact on RSM Targets	Take Forward
Deployment of additional ferries – larger than present (longer LOA) (assuming current fleet is retained / replaced)	<ul style="list-style-type: none"> - New vessels would be more comfortable and better equipped - Additional vessels will allow new services and potentially a longer operating day - Improved physical access - Journey times may be reduced if new vessels are faster 	<ul style="list-style-type: none"> - Allied harbour improvements may allow vessels to berth overnight on a regular basis - Better seakeeping of larger vessels may improve reliability 	<ul style="list-style-type: none"> - Harbour improvements if longer vessels are necessary – North Ronaldsay, Stronsay, Eday and potentially others 	<ul style="list-style-type: none"> - Maintenance of existing vessels, or purchase of multiple new vessels - Higher capital cost of new larger ferries - Harbour improvement costs to accommodate larger vessels 	<ul style="list-style-type: none"> - Additional vessel(s) would improve connectivity by providing additional services and potentially facilitating a longer operating day - Potential increase in car deck capacity relative to today depending on vessel size 	✓
Deployment of additional Foot Passenger ferries (supplementing existing 3 RoPax operation)	<ul style="list-style-type: none"> - Would provide additional connectivity - Comfort & Safety may be an issue 	<ul style="list-style-type: none"> - A substantial vessel would likely be required to perform reliably - Life expired RoPax ferries would still need to be replaced 	<ul style="list-style-type: none"> - Some minor adaptation of harbour infrastructure may be required 	<ul style="list-style-type: none"> - Maintenance of existing vessels or purchase of new vessels to replace life expired fleet - Potentially lower costs associated with new foot-passenger only vessels, although the requirement for a substantial vessel (given the operating environment) would offset this 	<ul style="list-style-type: none"> - Would provide additional connectivity but for foot passengers only 	↔ Only provides partial connectivity
Deployment of North Ronaldsay / Papa Westray freight only vessel – replacing one of the current RoPax vessel	<ul style="list-style-type: none"> - Perception of reduced service for North Ronaldsay & Papa Westray - Reduced capacity across the network with loss of third RoPax vessel 	<ul style="list-style-type: none"> - Depends on vessel type and its suitability to serve other islands - Price incentives could be used for this service 	<ul style="list-style-type: none"> - Some minor adaptation of harbour infrastructure may be required for freight vessel 	<ul style="list-style-type: none"> - Freight only vessel cheaper to acquire and operate than equivalent RoPax - Other two life-expired RoPax still need replacing 	<ul style="list-style-type: none"> - Limited impact – could provide a more regular service for North Ronaldsay & Papa Westray - Having only 2 * RoPax for the remainder of the network may not be sufficient and would lead to reduced ferry connectivity 	↔
Deployment of North Ronaldsay & Papa Westray freight only vessel – supplementing 3*RoPax vessels	<ul style="list-style-type: none"> - Perception of reduced service for North Ronaldsay & Papa Westray - Would allow additional services elsewhere - Could improve car deck availability elsewhere as freight switches to new vessel 	<ul style="list-style-type: none"> - Depends on vessel type and its suitability to serve other islands - Price incentives could be used for the new freight service 	<ul style="list-style-type: none"> - Some minor adaptation of harbour infrastructure may be required for freight vessel 	<ul style="list-style-type: none"> - Freight only vessel cheaper to acquire and operate than equivalent RoPax - All three life-expired RoPax still need replacing - Smaller new RoPax vessels may be sufficient if some freight switches to freight only service 	<ul style="list-style-type: none"> - Could provide a more regular service for North Ronaldsay & Papa Westray - Freeing up the third RoPax from North Ronaldsay would allow for greater connectivity on a Tuesday / Friday (summer) 	✓

	Public Implications	Operational Implications	Infrastructure Implications	Costs and Resources	Impact on RSM Targets	Take Forward
Relocations of Harbours (i) Stronsay (NW) (ii) Eday (W)	- Shorter crossing times to Kirkwall	- Stronsay: Shorter crossings to Eday / Kirkwall & easier vessel navigation compared to current terminal - Eday: Shorter crossing to Kirkwall	- New Harbours required	- Cost of new harbours and associated road infrastructure etc	- Facilitates shorter crossings so modest potential impact on connectivity	✓
Full RoPax for North Ronaldsay and Papa Westray 3 * RoPax vessels	- Step change in vehicular access to these two islands - The Council explain that this may require an adjustment in the air service to ensure parity with other islands.	- Investment would imply a more regular service for Papa Westray and North Ronaldsay	- New linkspans and associated infrastructure at Papa Westray and North Ronaldsay - Creation of non-tidal terminal at North Ronaldsay	- New linkspans and associated harbour works - Replacement of current RoPax fleet	- Would imply better connectivity for Papa Westray and North Ronaldsay at the expense of the other islands as existing vessels are redeployed	↔ Loss of connectivity for other four island
Full RoPax for North Ronaldsay and Papa Westray 3+ RoPax	- Step change in vehicular access to these two islands - The Council explain that this may require an adjustment in the air service to ensure parity with other islands	- Investment would imply a more regular service for Papa Westray and North Ronaldsay	- New linkspans and associated infrastructure at Papa Westray and North Ronaldsay - Creation of non-tidal terminal at North Ronaldsay	- New linkspans and associated harbour works - Replacement of current RoPax fleet and purchase of additional ferry - Previous STAG work suggests costs would be very high	- Better connectivity for Papa Westray and North Ronaldsay - Improved services elsewhere with additional vessel(s)	✓
Westray – Papa Westray RoPax ferry service	- Step change in vehicular access to Papa Westray via 5km crossing	- New RoPax (eg 'Loch Class' service) - Withdrawal of current Papa Westray LoLo ferry calls (only 2 per week) - Papa Westray air services would continue - Retirement of Golden Mariana, no obvious redeployment opportunity in OIC	- 'Hard ramps' at existing termini	- Harbour works - RoPax vessel - Increased operating costs over existing ferry	- Much improved connectivity for Papa Westray, albeit via a regular ferry link to Westray - No other impacts	✓
Eday Hub	- All services routed via interchange to frequent Kirkwall-Eday shuttle - Changing ferries mid-journey would not be popular	- Complete reorganisation of ferry services required - May require more than one berth at Eday to minimise transhipment time - No impact on air services - Concentration of services on Eday would require large vessel for Eday-Kirkwall shuttle	- Potential relocation of harbour, or expansion of current harbour	- Harbour works at Eday - Larger vessel for Eday-Kirkwall shuttle	- Major improvement at Eday if shuttle service to Kirkwall established - Benefits to other islands less obvious as changing vessels at Eday would in some ways reduce connectivity	↔ would only have merit as part of a Fixed Links package

Proposal FIXED LINK						
Papa Westray to Westray Fixed Link	<ul style="list-style-type: none"> - Allow car-based Papa Westray residents to access the existing good ferry service from Westray - Provision would have to be made for those without access to a car who currently use the foot passenger ferry 	<ul style="list-style-type: none"> - Foot passenger ferry service between Westray and Papa Westray discontinued (no obvious redeployment opportunity within OIC) - Air service to Papa Westray discontinued - Would reduce by one the number of Outer Isles to be served by ferries 	<ul style="list-style-type: none"> - Papa Westray to Westray Fixed Link - Potential wind down of Papa Westray harbour and airfield 	<ul style="list-style-type: none"> - Fixed link and associated cost - Current <i>MV Golden Mariana</i> ferry costs eliminated - Papa Westray airstrip closed / downgraded 	<ul style="list-style-type: none"> - Taking Papa Westray out of the timetable (19 arrivals / departures per week) would allow improved air services elsewhere 	✓
Westray to Eday Fixed Link	<ul style="list-style-type: none"> - Would allow car-based Westray residents to access ferry services via Eday - Provision would have to be made for those without access to a car - Much improved air connectivity for Eday residents (either via Westray) or improved frequency from Eday - Improved ferry service for Eday residents – higher frequency 	<ul style="list-style-type: none"> - Link would block the current sea route to North Ronaldsay (unless built as a high bridge) - Closure of either Westray or Eday airstrip - Ferry services to Westray would be discontinued - Air services to either Westray or Eday would be discontinued - A new western harbour on Eday would reduce crossing distance to Kirkwall from around 30km (from Westray) to 23km (Eday - west) - Would reduce by one the number of Outer Isles to be served by ferries 	<ul style="list-style-type: none"> - Westray to Eday Fixed Link [potential relocated harbour at Eday] - New roads on intermediate islands - Potential wind down of Westray harbour 	<ul style="list-style-type: none"> - Fixed link and associated cost - Removal of Kirkwall-Westray ferry link would free up near full time vessel to improve services between Kirkwall – Eday – Sandy / Stronsay - Westray or Eday airstrip closed or downgraded - Unlikely that this measure would lead to the disposal of one of the three ferries, ie three Outer Isles vessels would still be required to provide sufficient capacity and connectivity 	<ul style="list-style-type: none"> - Kirkwall-Westray operates at present on a near-shuttle basis (17 ferries per week from Westray), these sailing hours would be available for use elsewhere - Limited impact on flights, as Eday has very few flights and Westray flights would continue or be combined with Eday 	✓
Kirkwall to Shapinsay Fixed Link & Shapinsay 'land bridge'	<ul style="list-style-type: none"> - All Outer North Isles services would terminate at a new harbour at Shapinsay, reducing sailing distance by around 10km - Potentially shorter journey times to Kirkwall - Could have highly negative impact on Shapinsay community 	<ul style="list-style-type: none"> - Complete reorganisation of ferry services required - Onward public transport required to Kirkwall from Shapinsay - No impact on air services 	<ul style="list-style-type: none"> - Shapinsay-Kirkwall tunnel - New harbour at north Shapinsay - Potentially improved road links on Shapinsay 	<ul style="list-style-type: none"> - Fixed link and associated cost - Unlikely that this measure would lead to the disposal of one of the three ferries, ie three Outer Isles vessels would still be required to provide sufficient capacity and connectivity - Cost reductions due to withdrawal of Shapinsay ferry - Costs seen to be prohibitive. 	<ul style="list-style-type: none"> - Shorter crossing distance to Shapinsay (rather than Kirkwall) from each island would allow for more connections across the network 	↔ Ruled out on basis of public acceptability and cost

6.3.9 The options above which do not contribute to the RSM connectivity and capacity objectives are sifted out at this stage.

6.3.10 The table below shows all the options not discounted at this stage which in isolation would make a contribution to meeting the RSM objectives – ie increased connections, sufficient capacity, and longer operating day, together with a high level assessment against the five STAG criteria. The appraisal uses the following seven-point scale as defined in STAG:

- ✓✓✓ **Major benefit** - these are benefits or positive impacts which, depending on the scale of benefit or severity of impact, the practitioner feels should be a principal consideration when assessing a option's eligibility for funding;
- ✓✓ **Moderate benefit** - the option is anticipated to have only a moderate benefit or positive impact. Moderate benefits and impacts are those which taken in isolation may not determine an option's eligibility for funding, but taken together do so;
- ✓ **Minor benefit** - the option is anticipated to have only a small benefit or positive impact. Small benefits or impacts are those which are worth noting, but the practitioner believes are not likely to contribute materially to determining whether an option is funded or otherwise.
- ‘-‘ **No benefit or impact** - the option is anticipated to have no or negligible benefit or negative impact.
- ↔ **Small minor cost or negative impact** - the option is anticipated to have only a moderate cost or negative impact. Moderate costs/negative impacts are those which taken in isolation may not determine an option's eligibility for funding, but taken together could do so.
- ↔↔ **Moderate cost or negative impact** - the option is anticipated to have only a moderate cost or negative impact. Moderate costs/negative impacts are those which taken in isolation may not determine an option's eligibility for funding, but taken together could do so;
- ↔↔↔ **Major cost or negative impacts** - these are costs or negative impacts which, depending on the scale of cost or severity of impact, the practitioner should take into consideration when assessing an option's eligibility for funding.

Table 6.3: Appraisal Against STAG Criteria

SHORTLIST	ENVIRONMENT	SAFETY	ECONOMY	INTEGRATION	ACCESSIBILITY AND SOCIAL INCLUSION
Replacement Aircraft – larger than current	↔ Larger aircraft likely to use more fuel, although may be more fuel efficient	✓ Larger aircraft may imply non single pilot operation	✓ Minor benefit as connectivity is improved	- Potentially positive if integration at Kirkwall was to be improved	✓ Large aircraft may improve access for elderly or disabled
Additional Aircraft – like for like	↔ Increased emissions associated with more flights	-	✓✓ Moderate benefit as connectivity is improved	- Potentially positive if integration at Kirkwall was to be improved	✓✓ Greater connectivity may improve social inclusion
Additional Aircraft – larger than current	↔ Larger aircraft likely to use more fuel, although may be more fuel efficient	✓ Larger aircraft may imply non single pilot operation	✓✓ Moderate benefit as connectivity and each flight's capacity is improved	- Potentially positive if integration at Kirkwall was to be improved	✓✓ Greater connectivity may improve social inclusion and larger aircraft may improve physical access
Night flying to extend the operating day	↔ Longer operating day may bring local noise impacts	-	✓✓✓ Major benefit to all Outer North Isles as daily commuting to Kirkwall now possible, although capacity would be limited depending on the number and type of aircraft deployed	- Potentially positive if integration at Kirkwall was to be improved	✓✓ Greater connectivity across the operating day may improve social inclusion
3 * Replacement ferries – larger than present (longer LOA)	↔ Larger vessels likely to use more fuel, although they should be more fuel efficient than current vessels	-	- No significant change to service offering	-	✓ New vessels would offer improved physical access and comfort levels
Deployment of additional ferries – size broadly like for like	↔↔ Increased emissions associated with more sailings, although this would be dependent on vessel design	-	✓✓ Moderate benefit as connectivity is improved	-	✓✓ Greater connectivity would improve social inclusion
Deployment of additional ferries – larger than present (longer LOA) , (assuming current fleet is retained / replaced)	↔↔↔ Increased emissions associated with more sailings, although this would be dependent on vessel design	-	✓✓✓ Major benefit as connectivity and capacity is improved	-	✓✓ Greater connectivity would improve social inclusion

SHORTLIST	ENVIRONMENT	SAFETY	ECONOMY	INTEGRATION	ACCESSIBILITY AND SOCIAL INCLUSION
Deployment of North Ronaldsay & Papa Westray freight only vessel – supplementing 3*RoPax vessels	↔ Freight vessel would add further to emissions	-	✓✓ Potential benefits to North Ronaldsay and benefits to other islands as current North Ronaldsay steaming times are freed up	-	✓✓ Greater connectivity would improve social inclusion
Relocations of Harbours (i) Stronsay (NW) (ii) Eday (W)	↔↔↔ New construction work could have significant environmental impacts	-	✓ Shorter journey times would bring benefits but impact on daily connectivity may be modest	-	-
Full RoPax for North Ronaldsay and Papa Westray 3+ RoPax	↔↔↔ - New construction work could have significant environmental impacts	✓ All weather berths would allow safer berthing at these challenging ports	✓✓✓ Major benefit as connectivity and capacity is improved	-	✓✓ Greater connectivity would improve social inclusion
Westray – Papa Westray RoPax ferry service	↔↔↔ - New construction work could have significant environmental impacts - RoPax vessel would likely use more fuel than current passenger only vessel	-	✓ Benefits to Papa Westray and Westray only	-	✓ Larger RoPax vessel may bring better physical access and passenger comfort
Papa Westray to Westray Fixed Link	↔↔↔↔ - New construction work could have significant environmental impacts - Reduced emissions from withdrawal of Papa Westray – Westray ferry services	✓ - Potential safety improvement depending on nature of fixed link	✓✓ Full connectivity at no cost would add to the Westray / Papa Westray economy, although tourism may be affected (novelty of existing Papa Westray flight)	-	✓ May bring social inclusion benefits to Papa Westray in particular
Westray to Eday Fixed Link	↔↔↔↔ - New construction work could have significant environmental impacts - No change in emissions if Westray ferry redeployed to improve connectivity elsewhere	✓ - Potential safety improvement depending on nature of fixed link	✓✓ Westray to Kirkwall travel times would be reduced, and there would be improved connectivity between Eday and Kirkwall	-	✓ May bring social inclusion benefits to Eday and Westray

6.3.11 The table below now shows the shortlisted options in terms of:

- Feasibility;
- Affordability; and
- Public Acceptability.

Shortlisted Measure	Feasibility	Affordability	Public Acceptability
Replacement Aircraft – larger than current	- No significant feasibility issues – potentially some issues regarding new navigational technologies	- New Twin Otter aircraft circa £3m-£5m each - Crewing and operational costs unknown - Relatively low cost compared to new ferries - Airfield upgrades costs unknown	- Untested - Likely to be popular but only if not at the expense of a diminution of the ferry service
Additional Aircraft – like for like	- No issues	- Circa £1m for new Britten Islander aircraft - Crewing and operating costs unknown - Low cost compared to new ferries - No airfield upgrades required for existing aircraft type	- Untested - Likely to be popular but only if not at the expense of a diminution of the ferry service
Additional Aircraft – larger than current	- No significant feasibility issues – potentially some issues regarding new navigational technologies	- New Twin Otter aircraft circa £3m-£5m each - Crewing and operational costs unknown - Relatively low cost compared to new ferries - Airfield upgrades costs unknown	- Untested - Likely to be popular but only if not at the expense of a diminution of the ferry service
Night flying to extend the operating day	- Should be no significant feasibility issues	- Investment required in airstrip lighting and potentially navigational aids - Costs unknown at this stage	- Untested – the opening up of a working day in Kirkwall may be more important for those considering a move to the Outer North Isles in future than for current residents - A key issue to explore in consultation
3 * Replacement ferries – larger than present	- Larger ferries likely to require harbour works at Eday, North Ronaldsay and Stronsay in particular, but potentially others too	- New(larger) ferries circa £15m-£20m - Harbour improvement costs unknown	- Untested – but no reason to believe this would not be popular
Deployment of additional ferries – size broadly like for like	- No issues	- New (like for like) ferries circa £10m-£15m	- Untested – but no reason to believe this would not be popular
Deployment of additional ferries – larger than present	- Larger ferries likely to require harbour works at Eday, North Ronaldsay and Stronsay in particular, but potentially others too	- New ferries circa £15m-£20m - Harbour upgrades, costs unknown	- Untested – but no reason to believe this would not be popular
Deployment of North Ronaldsay freight only vessel – supplementing 3*RoPax vessels	- No significant feasibility issues	- Freight only vessel significantly cheaper to acquire and operate than RoPax, costs circa £5m-£10m - Operating costs unknown - Non-tidal harbour for North Ronaldsay costs unknown	- Untested on North Ronaldsay. May be acceptable if a more frequent service results (also for Papa Westray), and if the air service is improved - Likely to be popular elsewhere as the third RoPax vessel would be freed up from the North Ronaldsay run
Relocations of Harbours (i) Stronsay (NW) (ii) Eday (W)	- Should not require any new or innovative techniques. - Feasibility dependent on environmental issues	- No costs available - detailed analysis of costs and benefits would be required	- Untested – likely local opposition from those directly affected

Shortlisted Measure	Feasibility	Affordability	Public Acceptability
Full RoPax for North Ronaldsay and Papa Westray, 3+ RoPax	- May be feasibility issues with creating non-tidal access and suitable berth – no feasibility work undertaken to date	- Implies an additional RoPax, so four new vessels in total - Costs of linkspans and other harbour improvements at North Ronaldsay and Papa Westray unknown	- Untested but likely to be popular in Papa Westray and North Ronaldsay - However, Council note that reduction in air service may be required to ensure parity with other islands.
Westray – Papa Westray RoPax ferry service	- No significant engineering feasibility issues - There may be environmental constraints	- Relatively low cost measures - Harbour improvement costs unknown - ‘Loch Class’ style vessel £6m (2007) but second hand vessels may be available from CalMac - Crewing and operating costs unknown	Untested but likely to be popular in Papa Westray
Papa Westray to Westray Fixed Link	- Significant uncertainties in feasibility of construction – no feasibility work undertaken to date - Feasibility also dependent on environmental issues	- Very high capital cost – crossing would be around 2.5km - Water may be too deep for causeway so bridge may be required - Figure of £300m has been quoted in the press - Saving in operating costs of current service	Untested but potentially a divisive issue
Westray to Eday Fixed Link	- Significant uncertainties in feasibility of construction – no feasibility work undertaken to date - Feasibility also dependent on environmental issues	- Very high capital cost – three separate links totalling around 1.6km assuming intermediate islands are used - New road infrastructure also required on intermediate islands	Untested but potentially a divisive issue

6.4 Key Dates & Deadlines

6.4.1 This section sets out an initial view on the key dates and deadlines which will provide the framework for future options for the development of the Outer North Isles network. In developing a strategic blueprint of this nature, there are certain forks in the road where a decision must be taken on which way to go. This section attempts to identify where these forks are and the issues which will need to be considered in advance. The dates below are not set in stone but provide a guide as to when major decisions will be required.

6.4.2 This is set this out in terms of a chronology, based on assumed asset expiry dates, lead times and tendering periods. Assumptions underpinning this analysis are:

- The current Outer North Isles ferries would, in an ideal world be retired at the age of 30 – 2018 for the MV *Varagen* and 2019 for the MV *Earl Sigurd* and MV *Earl Thorfinn* - although it should be acknowledged that this will not automatically be the case for Outer North Isles vessels.
 - Vessels sailing in UK waters have a nominal lifespan of 30 years, whereafter it is generally considered inefficient to continue operating them. That said, several of Orkney Ferries' vessels are now in their mid-thirties. Should Orkney Ferries decide to continue operating the ferries beyond their 30th birthday, the necessary ferries related decision points would move back accordingly.
- The current Britten-Norman aircraft will be retired in 2020-21
 - In our recent option generation workshop, Loganair suggest that the current Britten-Normen Islanders could continue in operation for many years but, from an asset integrity point of view, they would look to begin replacing them in around 6-7 years time (probably on a like-for-like basis)

6.4.3 Each year is now taken in turn.

2015

- *Key Milestones*
 - *None*

6.4.4 Within the timeframe set out in this study, 2015 and indeed early 2016 would be a year of preparation for defining the future service pattern for the Outer North Isles. This would be focused on governance and firming up the options developed in this paper.

STAG Part 2 Appraisal

6.4.5 As indicated at the outset of this report, this study effectively forms a STAG Part 1 Appraisal, which is a high level appraisal and identification of options to be taken forward to the more detailed STAG Part 2 Appraisal.

6.4.6 A STAG Part 2 Study would not be an insignificant exercise but would help to the Council to identify a preferred evidence-based option package to take forward to implementation in the long term. A key part of this exercise would be to carry out cost-benefit analysis of the option packages as well as in-depth evaluations against the STAG criteria and 'SMART' Transport Planning Objectives.

- 6.4.7 The type of infrastructure being considered in this study (particularly in relation to ferries) has long lead times and will require decisions to be taken in the near future if such infrastructure is to be in place before the current assets expire.
- 6.4.8 Carrying out an overarching STAG Part 2 would be far more efficient and integrated than bespoke studies considering issues in isolation, fixed links or ferry replacement for example.

Liaison with Transport Scotland

- 6.4.9 In parallel to undertaking a STAG Part 2 Study, Orkney Islands Council would need to work closely with Transport Scotland with regards to determining the future organisational arrangements and responsibilities for Orkney Ferries. Resolving this issue is critical to the ferry related investment decisions which would follow.
- 6.4.10 Ideally, Transport Scotland would be a key stakeholder on any steering group for the STAG Part 2, ensuring buy-in to the process.

Tendering

- 6.4.11 Irrespective of whether the Orkney Islands services were to fall under the remit of Transport Scotland or otherwise, a key requirement before commissioning any new assets would be to identify whether the Council wishes to tender its ferry services.

2016

- Key Milestones
 - Completion of STAG Part 2 Study.
 - Loganair PSO expires on 31st March 2016 and decision needs to be taken as to whether to offer one year extension.
 - Work on the next PSO specification is anticipated to be undertaken in 2015/16.

Completion of STAG Part 2 Study – Decision Points

- 6.4.12 The Council should look to complete the STAG Part 2 study in early 2016 and use it to set out a definitive and agreed roadmap for the future of services to the Outer North Isles. Key decisions which would need to be taken at this stage are:
- Whether fixed links are part of the future service mix and, if so, when these will be delivered;
 - The preferred options for ferry services to North Ronaldsay and Papa Westray;
 - Linked to the above, identification of what new vessels are required, how these will be procured and funded;
 - Required port & harbour infrastructure for ferries and how this will be procured and funded;
 - Future aircraft requirements and how these will be procured and funded; and
 - Required investment in airfields and aids to navigation and how these will be procured and funded.

6.4.13 This would be supplemented by a detailed delivery plan taking account of asset replacement needs. In particular, given the lead time for any fixed links or harbour relocations, a short-term solution would be required to extend the life of existing ferries beyond the nominal 30 year horizon or charter temporary vessels until such time as the new infrastructure was in place.

Preparation for the 2017 Air PSO Tender

6.4.14 Assuming that Loganair's current contract is extended to 31st March 2017, the focus in mid-late 2016 would be scoping out the requirements of the next PSO. Given the lead time for procuring new aircraft and training crew, it is highly unlikely that any significant changes to the current operation could be realised within the next tender period which, based on the previous tender, would run to 2020 or 2021.

6.4.15 This PSO should however reflect any short-term outputs of the STAG Part 2 which can be easily accommodated. These could include, for example, service changes within the current operational envelope or demand management pricing on peak services.

2017

■ *Key Milestones*

- *If Orkney Islands Council is ordering new vessels directly and the 30 year timescale is adhered to, an order for the first new vessel to replace the MV Varagen would be required early in this year.*
- *Detailed engineering studies considering fixed links and / or airfield enhancement required should these options be taken forward.*

2018

■ *Key Milestones*

- MV Varagen retired (assuming retirement at 30 years although this is not a 'hard' constraint)*
- *If Orkney Islands Council is ordering new vessels directly, an order for two new vessels to replace the MV Earl Sigurd or Earl Thorfinn would be required early in this year (again assuming replacement at 30 years, which is not a hard constraint).*

2019 Onwards

■ *Key Milestones*

- *Longer-term options such as additional vessels, new / enhanced port infrastructure, new / enhanced airport infrastructure and fixed links introduced over time*
- *New Outer North Isles Air PSO issued in late 2020, for 2021 commencement date. This could include a requirement for one or more new aircraft*

6.5 The Next Steps

6.5.1 The work to date broadly represents a STAG Pre-Appraisal and Part 1 Appraisal. The end point of a Part 1 Appraisal is a set of options to take forward to more detailed analysis in a Part 2 Appraisal as shown in the tables above. The logical step to progress the study would be to undertake a STAG Part 2 Appraisal based on the options emerging above. A Part 2

Appraisal comprises a much more detailed analysis of the options in terms of their benefits, costs and impacts, as encapsulated by the Planning Objectives and the STAG criteria.

6.5.2 In this case, the key outcomes from a STAG Part 2 study would be:

- An **agreed medium term solution** for meeting the connectivity needs of the Outer North Isles, in terms of the mix of ferry and air services, and fixed links, based on an objective led analysis and comprehensive consultation with the communities concerned; and
- A timed **Route Map** to achieving this solution including key milestones in planning and procurement.

6.5.3 Some of the areas which would form a particular focus of any Part 2 Appraisal are discussed in the paragraphs which follow.

Consultation

6.5.4 As has been discussed, the levels of connectivity implied by the RSM could be met by a variety of means based on ferries, air services and fixed links, and each of the options developed above would make a contribution to meeting these objectives.

6.5.5 The options listed above could be combined in a large number of ways to meet the RSM-based planning objectives, and it is not possible at this stage to define an optimal package. This would require a careful analysis of the costs, benefits and impacts associated with each individual measure as well as combinations of measures.

6.5.6 A key element in refining this list and creating meaningful packages of options would be **consultation with islanders**. An important issue within this is the nature of the travel choices and preferences of islanders, particularly the choice between air and ferry and how they would view the optimal mix between the two. Similarly, fixed links may not be worth pursuing further if there is no appetite locally for this measure.

6.5.7 The recommended next stage would therefore be a programme of consultation with islanders focussed on their views on the optimal mix of ferry / air / fixed link connections, all presented in the context of the RSM derived objectives. Of particular interest would be the decision making between the use of air and ferry, and to what extent that decision is constrained by the availability of capacity on the aircraft.

6.5.8 We have found in the past that 'drop in' sessions are a successful way to engage with the public. Typically this would take the form of a series of exhibition type stands, manned by project team staff who can discuss the material presented with the public. In this way, a lot of qualitative information is obtained at first hand. A *Pro Forma* would also be supplied for the public to express their views / preferences in a consistent way and allow for later quantitative analysis.

6.5.9 The analysis so far has been largely qualitative, driven mostly by a lack of data. The Part 2 Appraisal would be much more quantitative and as such would require a significant amount of data and analysis. Some of this additional data requirement is touched on below:

Consultation

- How do islanders currently use air and ferry services? (supplementing RSM survey);
- What do islanders want for the future of their services? (see above); and
- What are the key issues and constraints in terms of other stakeholders – businesses, tourism, local authority departments (eg education), supply chain etc.

Capacity Data

- Sailing by sailing data - if the case for additional capacity is to be made, we need to demonstrate that the current ferry capacity is not meeting the needs of the island and islanders; and
- Further air service data.

Financial data

- If an accurate assessment of the costs associated with the options is to be undertaken, a good understanding of the current finances of the air and ferry services is required – it is noted that there may be data confidentiality issues here.

Costs and Benefits of Options

- Conventional TEE analysis is unlikely to be suitable for the Outer North Isles, as this is primarily based on travel time savings, revenue and vehicle operating costs, rather than the supply of lifeline connectivity;
- Benefits may have to be expressed in terms of connectivity and in other ways, associated with sustaining and growing the islands in the longer term;
- Other aspects of the valuation of connectivity improvements may have to be considered such as 'option values';
- Costs and design of suitable new vessels and aircraft will need to be identified; and
- Engineering and costing of infrastructure options would be required to be estimated – airfield / harbours / fixed links.

Environment

- A number of the options involve physical infrastructure which could have very significant environmental impacts - these impacts will need detailed analysis; and
- Strategic Environmental Assessment (SEA) is likely to be required.

Institutional Arrangements and Procurement

- There are a range of funding and procurement options including eg funding sources, contract durations, tendering, role of Transport Scotland, role of CMAL, role of the private sector etc; and
- The Part 2 Appraisal may not be able to resolve all these issues (ie agreement may not be possible amongst all stakeholders) but should at least mark out key decision points and consequences.