TRANSPORT SCOTLAND

CALMAC FERRIES

Operators of Caledonian MacBrayne

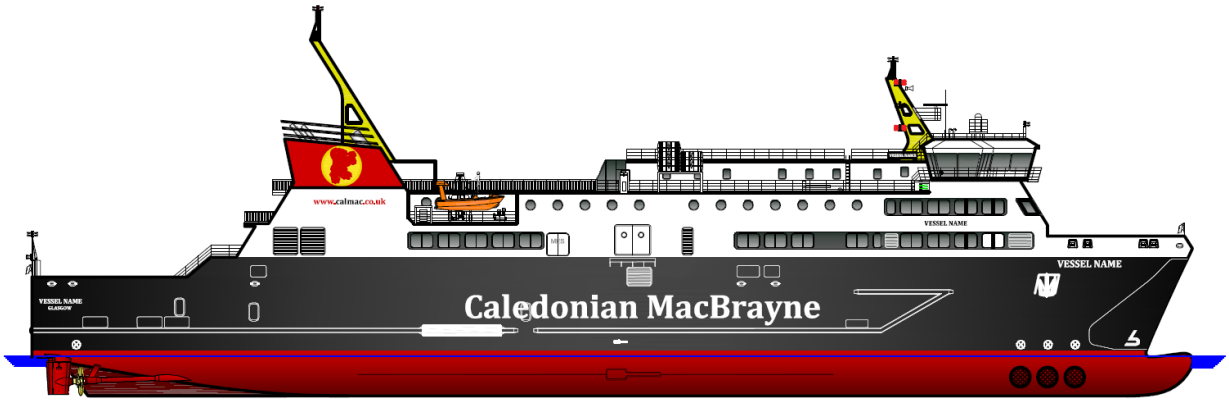
CMAL

Caledonian Maritime Assets Ltd

Stòras Mara Caileannach Eta

Subject:

Vessel Replacement and Deployment Plan



Document:

Annual Report 2015

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2 INTRODUCTION

1. In October 2015 Transport Scotland published the first Vessel Replacement and Deployment Plan (VR&DP) Annual Report. The Report summarised the outputs of the VR&DP project up to the end of 2014. An update on progress made since the 2014 Annual Report was published can be found in Section 3.
2. Since the first annual report was published the 'tri-partite' group of Transport Scotland (TS), Caledonian Maritime Assets Limited (CMAL) and CalMac Ferries Limited (CFL) has continued to meet on a monthly basis. The scope of the tri-partite group meetings covers major vessels, non-major vessels and the supporting infrastructure required for the delivery of the Clyde and Hebrides Ferry Services Contract (CHFS).
3. The outputs from the group advised what a programme of vessel retentions, cascades, acquisitions and disposals may look like in order that the delivery of the *Scottish Ferry Services: Ferries Plan (2013-2022),* as it relates to CHFS, is fulfilled in the timescales indicated by the Scottish Government.
4. The Ferries Plan was published in 2012 and sets out Scottish Ministers' strategic guidance for all publicly funded ferry services in Scotland. This includes TS policy for the services it supports covering items such as timetables, fares and the replacement of vessels/ports.
5. The means by which publicly funded ferry services which fall within TS's remit are regulated are as follows:-
    a) Policy Responsibility - this sits with TS under Scottish Ministers
    b) Statutory Controls - the maritime sector is bound by international law and convention through a broad range of international, European and domestic laws
    c) Contractual Controls - all TS subsidised ferry services are tightly regulated by means of the public service contracts which stipulate precisely how the services will operate (fares, timetabling, vessels, performance measures etc.) thereby protecting the interests of ferry users

6. The Ferries Plan included a proposed Vessel Replacement Programme as well as a proposed Programme of Port and Harbour Works. These programmes were broadly developed to replace assets which were life expired, however, CFL advocated that as operator of the CHFS network it was best placed to lead the development of such programmes – this approach was agreed by the three parties and CFL has undertaken this task since November 2013.
7. In October 2015 the final tranche of CHFS services to join the Road Equivalent Tariff (RET) fares mechanism was completed. The reduction in ferry fares for passengers, cars and coaches on a large number of the busiest CHFS services is forecast to give rise to significant increases in demand, especially from cars.
8. The VR&DP is founded upon:-
    a) The Routes and Services proposals set out in the Ferries Plan
    b) The capacity and demand analysis set out in this Report
    c) The need to replace vessels as they reach the end of their working life

9. As set out in the Ferries Plan (Chapter 2, paragraph 9): *"Projects will be taken forward when resources are available and funding will be prioritised according to need."*

10. This second Annual Report summarises the outputs from the project up to the end of 2015.

3 PROGRESS UPDATE SINCE THE 2014 ANNUAL REPORT

11. The key recommendations from the 2014 Annual Report were:-

a) The procurement of 2 new 100 metres vessels - one for initial deployment on the service to Brodick and one for initial deployment on the Uig 'triangle (the exact sequence of deployment to be determined in 2016)

b) Engagement with the relevant harbour owners to accommodate the 2 new 100 metre vessels

c) Engagement with the same harbour owners to explore potential options for the larger vessels which may be procured in the medium-to-long term

d) Preparatory work to support the deployment of MV Isle of Lewis on the Oban-Craignure route from April 2016

e) The re-deployment of MV Hebrides to Oban based services following the deployment of the new vessel on the Uig triangle

12. Scottish Ministers accepted the recommendation of the VR&DP 2014 Report to procure 2 new vessels and funding was secured to allow this to progress. Construction work has since commenced on two new 100 metre vessels. The identical vessels will be powered by liquefied natural gas (LNG) as well as being able to run on low sulphur marine gas oil. They are due for delivery during 2018 and it is anticipated that one vessel will be initially deployed on services to Arran and the other on the Uig 'triangle'.

13. The anticipated deployment of MV Isle of Lewis to the Oban-Craignure route could not proceed following further assessment and berthing trials at Craignure. As an alternative, the MV Isle of Lewis has been deployed on the route between Oban and Castlebay. A number of other changes to services to Colonsay, Coll, Tiree, Lochboisdale and Armadale followed. This enabled the delivery of a number of Ferries Plan commitments.

14. Following the deployment of a new vessel to the Uig 'triangle' it was recommended that the MV Hebrides would be cascaded to Oban based services. With 2016 timetables bringing in a number of changes to Oban and Mallaig based services the redeployment of MV Hebrides will be kept under review.

15. There was recognition that services to Islay would need to be addressed in the medium-term.

16. In connection with the new vessels under construction a number of major shore-side projects are underway:-

a) Brodick (owned by CMAL) – construction of a new pier and shore infrastructure

b) Ardrossan (owned by Peel Ports) – a Ministerial task force has been set up and an appraisal of the mainland port options has been announced

c) Uig (The Highland Council), Tarbert (CMAL) and Lochmaddy (Comhairle nan Eilean Siar) – a multi-agency group led by CMAL has been set up to progress developments in advance of the new vessel

4 BACKGROUND

17. In 2015 CFL operated a fleet of 31 vessels (10 major and 21 non-major) in the delivery of the CHFS passenger and vehicle services. All of these vessels were chartered from CMAL by CFL.

18. The major vessels were built between 1984 and 2014 with the non-major vessels ranging from 1974 to 2014. The average ages of the two 'fleets' in 2015 was 19 years and 21 years respectively. (The definition of a major vessel is a vessel which was designed to operate principally to/from a linkspan and which has Euro Class B certification. Non-major covers all other vessels in the fleet.)

19. CFL will on occasions utilise charter vessels to supplement the CMAL vessels. Such use can range from a day up to 2 or 3 weeks cover periods of short-term increased demand or during periods of scheduled/unscheduled unavailability (of the CMAL vessels).

20. The fleet of vessels serve 49 ports across the west coast of Scotland with facilities ranging from unmanned slipways to ports with multiple linkspan berths.

21. As operator CFL is solely responsible for deciding, in line with contractual and operational requirements, which vessels are deployed on which routes in order to deliver the CHFS contract.

5 ASSUMPTIONS

22. In developing the VR&DP the tri-partite group agreed a number of assumptions which were to shape the analysis and outputs from the work. The key assumptions, which are kept under annual review, are as follows:-

a) The fundamental scope of the project is the Ferries Plan and End of Life / Use
b) Any recommendations will be based broadly on current (2016) timetables and will take into account future Ferries Plan enhancements
c) Demand in excess of 70% of the available weekly capacity is unsatisfied
d) Changes in fuel prices for road going vehicles will not have a significant bearing on demand
e) New vessel capacities will be based on vehicle capacity utilisation reaching an average of 70% across July and August in the 11th year of the vessel's deployment
f) Average vehicle sizes and weights will be unchanged during the analysis period

23. The Ferries Plan sets out a future service requirement for Colonsay which is based around MV Lochnevis – a non-major vessel. Some further work needs to done around this option so the working assumption remains that Colonsay will continue to be served by a major vessel. On the basis of this assumption the full delivery of the Ferries Plan would require a fleet of 11 major vessels, one more than assumed by the Ferries Plan itself.

24. Services between the mainland and Barra/South Uist have undergone a significant restructuring with both islands being served independently by separate dedicated vessels. Whilst this was not a stated output from the Ferries Plan the re-structuring has allowed the delivery of the Ferries Plan commitments albeit in a slightly different way from what the Plan envisaged.

25. Where timetable and vessel deployment assumptions have been made these do not pre-judge any future decision making. As stated in the Ferries Plan vessel deployment is entirely a matter for CFL. CFL keeps deployment plans under regular review to ensure optimal fleet deployment.

6 PRIORITIES

26. The 2014 Annual Report set out the operator's main criteria for vessels undertaking the lifeline CHFS services. The prioritised list, which is unchanged, was as follows:-

a) Safe
b) Reliable
c) Cargo deadweight capacity[1]
d) Manoeuvring, berthing and station keeping
e) Sea keeping and passenger/crew comfort
f) Redundancy
g) Fuel efficiency and emissions reduction

27. This priority list was agreed by tri-partite members as a common set of principles by which new vessels should be designed and built. With the exception of safety the other criteria will be kept under regular review.

7 APPROACH

7.1 The Ferries Plan (2013-2022)

28. In December 2012 TS published *Scottish Ferry Services: Ferries Plan (2013-2022)* on the back of the earlier Scottish Ferries Review. The Ferries Plan provides a basis for the shape of all of Scotland's ferry services until 2022 (and beyond as vessels have a 30 year design life) and underpins the development of this Vessel Replacement and Deployment Plan as it pertains to the operator of the CHFS contract. Whilst the Ferries Plan refers to the deployment of specific vessels it also makes it clear that it is for the CHFS operator to decide how fleet vessels are deployed whilst ensuring that the delivery of the Ferries Plan is ultimately fulfilled.

29. The Transport Minister in his Introduction to the Routes and Services Needs Based Assessment stated that:

> *"One of the key elements for the Ferries Review has been the development of a robust overarching framework or methodology for the determination of routes and services for those communities served by a ferry service. We developed this approach because we felt that it was absolutely essential that any changes to routes and services are based on*

[1] Cargo deadweight capacity is the total weight of passengers, vehicles and cargo which a vessel is permitted to carry. The cargo deadweight capacity can vary from one sailing to the next as items like volume of fuel, ballast water, fresh water and other fluids on-board the vessel can be a factor. A vessel's cargo deadweight capacity is typically at its lowest when the vessel has just re-fuelled and fresh water tanks have been filled. A low cargo deadweight can result in vessels sailing with vehicle space available but with no ability to carry any more weight.

objective evidence. Second, it is important that each community is treated on an equal footing by the Review. By choosing to develop and adopt an evidence-based methodology, we have insured against the prospect of favouring one community over another. Finally, we want a methodology that can be replicated to inform future changes to routes and services."

30. The Routes and Services Proposals contained in the Ferries Plan focus primarily on frequency of service and length of operating day. They do not directly address meeting volume demand, either by further increasing frequency or by increasing the capacity through the vessels utilised. It is a matter for the operator to deploy the fleet as they see fit to best meet capacity (and other operational) requirements.

31. The VR&DP is intended to complement the Ferries Plan by considering historical and projected customer demand and the on-going provision of capacity to meet that demand.

7.2 Independent Forecasts

32. Estimates of unconstrained demand for each of the communities served by CFL were prepared by Reference Economic Consultants. Traffic types included were passengers, cars, coaches and commercial vehicles and covered the period 2015 to 2040. The base carryings year was 2014 and this was for satisfied demand only.

33. As a means of providing greater depth to the unconstrained demand forecasts the tri-partite group agreed that one third of the CHFS network should be the subject of a 'deep-dive' analysis each year. The purpose of this is to include a wider ranging assessment of future demand and to include sectors of the economy which the regular annual forecasts do not include. For the 2015 Annual Report the Western Isles was selected for this deep-dive assessment – this includes routes to, from and within the Western Isles.

34. At this time, no quantitative analysis exists for true levels of unsatisfied demand in the CHFS network. As there is no currently recognised methodology for estimating unmet demand, Transport Scotland will work with CFL and other stakeholders to take this forward as part of the work on the 2016 report. CFL is also considering how a new ticketing and reservations system will be configured to support the collection of unsatisfied demand data in the future.

7.3 Capacity/Demand Model

35. To assist with the qualitative assessment of a demand led solution for vessel deployment and replacement two spreadsheet models were developed – one for the major fleet of vessels and the other for the non-major fleet. The models included the following main attributes:-

a) All CHFS routes modelled on a week-by-week basis for the period to 2040
b) 2015 actual weekly carryings for passengers, cars, coaches and commercial vehicles were used as the base year for demand
c) 2016 scheduled weekly capacity as the base level for capacity provision
d) Unconstrained demand forecasts by traffic type for 2016 to 2040
e) The ability to change weekly capacity provision (vessel and no. of sailings) over the life of the model

f) Ability to apply RET demand uplifts (split over 2 years) independently of the unconstrained forecasts

36. In order that an analysis of capacity utilisation can be performed, the model calculates the percentage utilisation of both actual and forecast passenger capacity and vehicle deck capacity. See Appendix 1 for an explanation of how capacity utilisation is calculated and the factors which can affect it. (It should be noted that the available passenger capacity was adequate to satisfy current and projected demand and that no further detail modelling was considered in this area.)

37. The numbers shown in Sections 8.1 and 8.2 are the average weekly capacity utilisation percentages across the 9 weeks that cover July and August. As a guide to what these capacity utilisation figures mean the following can be considered as a rough guide:-

a) Less than 30% - customers are almost always able to travel on their first choice of sailing. Full sailings are infrequent and overall utilisation levels are not a barrier to travel
b) Between 30% and 50% - an increase in the number of full sailings will be evident, however, customers will almost certainly be accommodated on the next sailing if their first-choice sailing is full. Full sailings are more frequent, however, customers are not deterred from travelling as a result
c) Between 50% and 70% - Full sailings are even more frequent and some customers may find that their choice of available sailings is limited. Some customers may choose not to travel as a result, however, volumes are not considered significant
d) Above 70% - Full sailings are a regular occurrence and an increasingly significant number of customers choose not to travel as alternative sailing times are not suitable. In some cases customers may displace to another route if an alternative is available

38. The data available for the models has some limitations as it is derived from the current business information system. Nevertheless, the same basis is used across the models ensuring that all routes are analysed on a consistent comparative basis.

39. The spreadsheet models and the methodology followed will give the required evidence based process which can be replicated in future years.

7.4 Impact of Changing Vehicle Type/Mix on Vessel Capacity

40. Increasing car sizes are continuing to have an impact on the number of vehicles which the CHFS vessels can convey. As an example vessels which were constructed in the 1980's were designed to accommodate cars from that era. Based on today's average car dimensions, the older vessels' effective car capacity, by number, is up to 20% less than it was originally. As well as car lengths and widths increasing, weights are also increasing. This increase in weight manifests itself when cars are stowed on vessel mezzanine decks. In order that safe working limits are not exceeded the number of cars stowed on the mezzanine decks of the older vessels may be reduced.

41. The number and length of commercial vehicles which can be conveyed by the vessels is largely unchanged from 'as built'. Exceptions to this are where vehicle decks have been modified or where cargo deadweight has reduced.

42. The full roll-out of RET across the CHFS network has resulted in a change of vehicle choice for many small commercial operators and tradesmen. The commercial attractiveness (i.e. fare price

and the lifting of previous 5 metre length threshold to 6 metres) of a Light Goods Vehicle (LGV) as opposed to a small Heavy Goods Vehicle (HGV) has resulted in a number of customers switching to LGVs. This transition from HGVs to LGVs will continue for a few years as operators gradually replace their vehicles. The impact of this change in customer behaviour affects the data recorded in current business information systems. HGV activity is recorded as commercial vehicles (CV) whilst LGV activity is recorded as cars. This change in classification makes it more difficult to identify the trends associated with LGV's as they are now collated with cars. As LGV's are larger than cars, the effect of this is to understate the actual capacity utilisation. CFL is reviewing other data sources to assist with the analysis of this changing behaviour.

8 ROUTES – 2015 DEMAND AND CAPACITY ANALYSIS

8.1 Model Outputs – Major Vessel Routes

43. The spreadsheet model developed to support the analysis for the major vessel fleet has been updated to reflect:-

a) 2015 actual carryings
b) 2016 to 2040 forecast carryings
c) 2015 actual capacity provision (based on the revised vessel capacity figures)
d) 2016 to 2040 forecast capacity based on the 2016 published timetables and vessel deployment plan, and with an assumed initial deployment for the two new 100 metre vessels from 2019

44. The model outputs were limited to the major vessel routes which formed the majority part of a vessel's deployment. This means the following 'spin-off' routes, i.e. routes which have resulted from the development of primary lifeline routes, were excluded from the detail analysis:-

a) Ardrossan-Campbeltown
b) Kennacraig-Islay-Colonsay-Oban
c) Oban-Coll-Tiree-Castlebay

45. The tri-partite group members agreed that the priority order for vessel deployment and replacement should be driven specifically by the average vehicle deck utilisation during July and August. The actual capacity utilisation levels for 2015 and the forecast capacity utilisation levels for 2016 to 2021 are as shown below. (Red highlighting indicates the highest level of capacity utilisation whilst blue indicates the lowest level.):-

Peak 9 weeks capacity utilisation (July & August)	**Actual 2015**	**Forecast 2016**	**Forecast 2017**	**Forecast 2018**	**Forecast 2019**	**Forecast 2020**	**Forecast 2021**
Ardrossan-Brodick	64%	66%	67%	69%	50%	52%	53%
Kennacraig-Port Ellen/Port Askaig	71%	68%	70%	72%	74%	75%	77%
Oban-Craignure	76%	85%	87%	89%	91%	93%	95%
Ullapool-Stornoway	62%	71%	72%	74%	75%	77%	78%
Uig-Tarbert/Lochmaddy	71%	75%	76%	78%	68%	69%	71%
Oban-Colonsay	36%	18%	19%	19%	19%	19%	19%

Oban-Coll/Tiree	73%	59%	60%	61%	62%	63%	64%
Oban-Castlebay/Lochboisdale	Due to route restructuring no analysis has been undertaken						

46. The Ferries Plan commitments have been largely delivered for the routes served by the major vessels. A commentary on how these commitments have impacted July and August services has been added to the analysis below.

47. Taking each route in turn, the modelled outcomes were as follows:-

8.1.1 Ardrossan-Brodick (Arran)

48. The figures for 2015 show the vehicle deck utilisation levels achieved in the first year of RET on the route. The increase in car demand from July and August 2014 to July and August 2015 was 43%. The route, which is currently served by MV Caledonian Isles and MV Isle of Arran, is anticipated to be the initial deployment for one of the new 100 metre vessels. The impact of the additional capacity in 2019 can be seen as a reduction in utilisation levels from 69% to 50%. (This assumes that the new 100 metre vessel and MV Caledonian Isles will cover the route in the summer.)

49. The Ferries Plan commitment for this route was the provision of a two vessel service between May and September. This has been in place since 2013.

8.1.2 Kennacraig-Port Ellen/Port Askaig (Islay)

50. Capacity utilisation levels on the Kennacraig-Islay route are forecast to reduce slightly between 2015 and 2016. Whilst an increase in demand is forecast the provision of additional capacity, achieved through a greater number of sailings by both MV Finlaggan and MV Hebridean Isles, will reduce levels of utilisation in the short-term. As demand continues to grow in the medium to long term vehicle capacity constraints would, in the absence of any further action, begin to reach levels where travel choices would be adversely affected. Any additional capacity would need to be suitable for the mainland and island ports; at present, and pending any enhancements to these facilities, the maximum size of vessel which can be timetabled for service on the route is 90 metres – the same size as MV Finlaggan.

51. The Ferries Plan committed to an overall increase in frequency of sailings to Islay (as well as a more equal spread of calls between Port Askaig and Port Ellen). This enhancement has taken place; there remains the implementation of a separate commitment to serve Colonsay with a dedicated vessel would indirectly increase frequency to Islay further still particularly on busy Saturdays.

8.1.3 Oban-Craignure (Mull)

52. Levels of capacity utilisation in 2015 reached a level where lack of capacity, as a barrier to travel, was significant. MV Isle of Mull was the sole vessel on the route in 2015. In 2016 weekly capacity on the route was increased by 23% utilising both MV Isle of Mull and MV Coruisk in line with the Ferries Plan commitment to provide a second vessel during the summer. This was also intended to help deal with the anticipated increase in demand following the commencement of RET on the route in October 2015. The number of car carryings in July/August 2015 and the same period in 2016 is forecast to increase by 35%. The net effect of this forecasted increase and the uplift in scheduled capacity will likely see vehicle deck utilisation levels reaching c.85%. At this level of capacity utilisation, the number of potential customers unable to travel on this

route is likely to be significant although two alternative routes are available for travellers to/from Mull which are not assessed as being under similar pressure and therefore provide some travel options. Oban-Craignure vessel deployment will be considered further in advance of the 2 new 100 metre vessels taking up service in the network and engagement with Argyll & Bute Council is already underway.

53. The Ferries Plan envisaged that the additional services on this route would have come through the purchase/charter of an additional vessel. Instead, the summer 2016 service was provided through fleet re-deployment.

8.1.4 Ullapool-Stornoway (Lewis)

54. Capacity utilisation on this route is forecast to increase significantly between July/August 2015 and the same period in 2016. In 2015 the route was operated by MV Loch Seaforth with additional peak time sailings provided by MV Isle of Lewis. For the major routes included in this analysis only the Oban-Colonsay route had a lower level of capacity utilisation than Ullapool-Stornoway in 2015. The combination of a forecast increase in demand and an overall reduction in capacity, with the MV Isle of Lewis redeployed to another Western Isles service (Oban-Castlebay), results in forecast levels of utilisation in 2016 increasing to 71%. Forecast growth in demand in the medium-long term will require an increase in capacity to maintain utilisation at optimal levels.

55. The Ferries Plan did not include any service commitments for this route.

8.1.5 Uig-Tarbert (Harris)/Lochmaddy (North Uist)

56. In the 2014 annual report this route was identified as the route with the greatest need for increased capacity and would benefit immediately from the deployment of one of the new 100 metre vessels. The effect of the additional capacity can be seen in the drop in utilisation levels from 78% in 2018 (MV Hebrides) to 68% in 2019. (The 2019 figures are based on an assumed capacity for the new vessel.) Forecast levels of utilisation post 2019 continue to be high and reinforce the need for greater capacity on this route in the longer-term as identified in the 2014 annual report. The cascade of MV Hebrides from this route following the arrival of the new 100 metre vessel opens up options for addressing capacity constraints elsewhere in the network.

57. Like Ullapool-Stornoway the Ferries Plan did not include any service commitments for this route.

8.1.6 Oban-Colonsay

58. Levels of capacity utilisation on this route are low and give no cause for concern. Operationally, demand on this route could be met by a smaller vessel than MV Clansman and with service frequency at summer 2015 levels, however, as set out in Section 5 above the vessel deployment option proposed in the Ferries Plan is not currently being taken forward and further work on the long-term solution for this service will be required .

8.1.7 Oban-Coll/Tiree

59. Capacity utilisation levels in 2015 were the second highest in the major vessel network. A change to a larger vessel in 2016 (MV Clansman) combined with an increase in timetable frequency has resulted in levels of utilisation in July and August which are manageable in the long-term.

60. The Ferries Plan did not contain any commitments for the summer service on this route.

8.1.8 Oban-Castlebay (Barra)/Lochboisdale (South Uist)

61. Services between Oban and Castlebay/Lochboisdale were fundamentally restructured at the start of the 2016 summer timetable. A dedicated vessel (MV Isle of Lewis) was allocated to a direct Oban to Castlebay service whilst another major vessel (MV Lord of the Isles) provided services between Mallaig and Lochboisdale. From the commencement of winter 2016/17 a link between Oban and Lochboisdale will be re-established. The inter-island service between Castlebay and Lochboisdale service has ceased (although the separate Sound of Barra service continues to provide a direct connection for most traffic between Barra and South Uist).

62. Given the timing of the changes to the services between the mainland and Castlebay/Lochboisdale no data for this annual report is available yet. These 'new' routes will be fully analysed for the 2016 annual report. On the basis of emerging 2016 data, there are no indications of significant capacity pressures on either the Oban-Castlebay or Mallaig-Lochboisdale services.

63. The Ferries Plan did not include any commitments for the summer service on this route, however, changes to the re-deployment of MV Isle of Lewis have resulted, as indicated above, in daily services provided by dedicated vessels serving both Castlebay (from Oban) and Lochboisdale (from Mallaig).

8.1.9 Summary: Major Vessel Routes

64. A number of routes served by the major vessel fleet are displaying levels of vehicle deck utilisation which suggest that unsatisfied demand is currently at, or will be during the CHFS2 contract period, a significant level. The revised pattern of vessel deployment on Oban 'long-haul' services, enabled by the full use of MV Isle of Lewis, combined with the change in mainland port for Lochboisdale services is expected to address the medium term challenges in these routes. The addition of the 2 new 100 metre vessels to the fleet will further address some of the challenging areas notably the Uig 'triangle' and services to Arran.

65. The major vessel capacity utilisation model also considered the levels of passenger capacity provided. Whilst some short-term peaking in demand is evident levels of utilisation are not at a stage where solutions need yet be explored.

8.2 Model Outputs – Non-Major Vessel Routes

66. An identical approach to that used for the major vessels has been adopted for the non-major vessels i.e. an update of the original spreadsheet model to reflect the most recent carryings data and the most up-to-date demand forecasts.

67. It should be noted that the non-major vessels can be subdivided into 2 groups – those which only (or regularly) operate to linkspans and those which operate to slips. Within the group which operate to linkspans (MVs Bute, Argyle, Coruisk and Lochnevis) there is a degree of interchangeability which addresses seasonality factors and relief cover. For the vessels which operate to slips this flexibility also exists, however, a factor which can limit the deployment of larger 'slip' vessels to routes is the availability and suitability of overnight berthing facilities (including charging points for the hybrid vessels). Height of tide limitations can also be amplified when a 'slip' vessel is required to operate to a linkspan – this is especially true during spring low tides.

68. With the exception of the service between Mallaig and the Small Isles the Ferries Plan does not envisage extensive changes to the routes and services on the non-major CHFS routes. Where a Ferries Plan commitment was made this has been included in the route commentary.

69. With 2015 as the base year for carryings data and with 2016 summer timetables and vessel deployment setting capacity levels the projected levels of vehicle deck utilisation across the non-major routes are as shown below. (Red highlighting indicates the highest level of capacity utilisation whilst blue indicates the lowest level.):-

Peak 9 weeks capacity utilisation (July & August)	Actual 2015	Forecast 2016	Forecast 2017	Forecast 2018	Forecast 2019	Forecast 2020	Forecast 2021
Claonaig & Tarbert-Lochranza	48%	55%	37%	38%	39%	39%	40%
Largs-Cumbrae	31%	39%	39%	40%	40%	41%	41%
Wemyss Bay-Rothesay	44%	48%	48%	49%	50%	50%	51%
Colintraive-Rhubodach	22%	23%	24%	24%	24%	25%	25%
Tarbert-Portavadie	18%	37%	38%	38%	39%	39%	39%
Tayinloan-Gigha	38%	39%	40%	40%	41%	41%	42%
Fionnphort-Iona	16%	19%	19%	20%	20%	20%	20%
Oban-Lismore	22%	29%	29%	30%	30%	31%	31%
Lochaline-Fishnish	32%	29%	29%	30%	30%	31%	31%
Tobermory-Kilchoan	26%	44%	33%	33%	34%	34%	35%
Mallaig-Small Isles	22%	23%	24%	24%	24%	24%	24%
Mallaig-Armadale	77%	87%	89%	91%	93%	95%	97%
Sconser-Raasay	23%	24%	26%	27%	27%	27%	28%
Barra-Eriskay	48%	57%	58%	59%	60%	62%	63%
Berneray-Leverburgh	63%	71%	72%	74%	75%	77%	78%

70. Overall levels of vehicle deck utilisation are generally lower than that typically seen on the routes served by the major vessels – the exceptions to this being the routes between Mallaig and Armadale and across the Sound of Harris (Berneray-Leverburgh). Whilst not contained in the figures shown, the Sound of Harris service can experience high loading levels in the winter as the route is limited to daylight operation only. During this period the frequency of sailings can be limited to as few as two round-trips per day.

71. The routes from Fionnphort to Iona and Mallaig to the Small Isles exhibit very low levels of utilisation. This is principally due to the restrictions placed on vehicles travelling to these communities – limited to residents only and to other vehicles connected with the provision of lifeline services e.g. refuse collection, tradesmen and utilities.

72. The majority of the non-major vessel routes are non-bookable for cars i.e. they operate on a turn-up-and-go basis. This can lead to short-term periods of high demand, full sailings and vehicles being left behind (usually until the next sailing but occasionally longer).

73. For the routes which are forecast to see capacity utilisation exceed 40% in 2016 a more detailed analysis of their demand versus capacity relationship is considered further as follows:-

8.2.1 Claonaig (/Tarbert)-Lochranza (Arran)

74. The capacity utilisation figures for 2015 show the vehicle deck utilisation levels achieved in the first year of RET on the route. The increase in car demand from July and August 2014 to July and

August 2015 was 35%. The second summer of RET on the route is forecast to bring a further uplift in car demand of c.15%. MV Catriona entered service on the route in September 2016. The impact of the additional capacity arising from this deployment can be seen in the reduced levels of capacity utilisation in 2017. As a result of the new vessel deployment, the MV Loch Tarbert will be available for re-deployment within the CHFS network.

75. The Ferries Plan did not include any commitments for the services on this route.

8.2.2 Wemyss Bay-Rothesay (Bute)

76. This route is served by MV Argyle and MV Bute. Vehicle deck utilisation figures are forecast to be 48% in 2016 – the first summer of RET on the route. At these levels of utilisation there will be a number of occasions where vehicles will be short-shipped (i.e. left behind as a result of the vehicle deck being full), especially at peak times of the week. The levels of capacity utilisation are such that vehicles will be virtually assured travel on the next sailing. Growth in demand on the route is forecast to be slight in the medium term with peak season capacity utilisation continuing at manageable levels.

77. The Ferries Plan did not include any commitments for the services on this route.

8.2.3 Tobermory (Mull)-Kilchoan (Ardnamurchan)

78. This route, which is served by MV Loch Linnhe, is expected to see the largest growth in car demand following the roll-out of RET. Fare price reductions of c.70% are resulting in demand increasing by up to 86% in one year. Similar to Wemyss Bay-Rothesay the levels of vehicle deck utilisation are forecast to give rise to some short-shipping of traffic but not yet at a significant level.

79. This route has the highest levels of utilisation of the single vessel routes which are served by the smallest vessels in the fleet (the other routes being Oban-Lismore and Tayinloan-Gigha). For modelling purposes only (i.e. this is not indicative of future vessel deployment plans, which have still to be finalised) the impact of deploying the larger MV Loch Tarbert, displaced from the Claonaig/Tarbert-Lochranza route, can be seen on the 2017 reduction in capacity utilisation.

80. The Ferries Plan did not include any commitments for the provision of services on this route.

8.2.4 Mallaig-Armadale (Skye)

81. Of all routes operated by CFL this is the route which is forecast, in 2016, to have the highest levels of vehicle deck utilisation. With levels forecast to be near 90% volumes of unsatisfied demand could be high. Following changes in vessel deployment in 2016, which resulted in this route being served by MV's Lord of the Isles, Lochinvar and Loch Bhrusda, a small increase in the capacity available was quickly consumed with the roll-out of RET to the route. The modelling in the table above assumes a continuation of the summer 2016 vessel deployment but this does not prejudge decisions on future vessel deployment.

82. The Ferries Plan did not include any commitments for the provision of services on this route.

8.2.5 Barra-Eriskay (Sound of Barra)

83. The vessel undertaking this service is MV Loch Alainn. In October 2015 RET was rolled out to the route with summer 2016 being the first real test of available capacity on the route. Vehicle deck utilisation levels of 57% are forecast for 2016 – this being a level which will result in full sailings on a relatively frequent basis. With customers able to make a reservation for this route, volumes of short-shipped traffic will be low and likely limited to turn-up-and-go traffic.

84. The transportation of tri-axle coaches and fully laden HGV's on this service can be a challenge at certain states of the tide.

85. The Ferries Plan did not include any service commitments for this route.

8.2.6 Berneray-Leverburgh (Sound of Harris)

86. Following the roll-out of RET to this route in October 2015 projected peak summer capacity utilisation levels are forecast to exceed 70%. Whilst this is a reservable service the volume of customers who are unable to travel on the route could be reaching significant volumes i.e. they choose not to travel as they cannot secure a reservation at a time that suits.

87. The Ferries Plan did not include any service commitments for this route.

8.2.7 Summary: Non-Major Vessel Routes

88. With the exception of the Mallaig-Armadale and Sound of Harris routes overall vehicle deck utilisation levels are considerably lower than that found on the major vessel routes. With the introduction of MV Catriona to the fleet and the potential cascade of MV Loch Tarbert to follow, two of the routes which are forecast to see utilisation levels increase markedly post RET roll-out will now no longer be as heavily constrained.

89. Once MV Catriona is fully operational an assessment of the vessel disposal options will be undertaken with the expectation that a number of the older small vessels will be retired from the CHFS fleet and decisions made on their future service or disposal.

90. Like the major vessels passenger capacity utilisation was analysed with no evidence of any constraints apparent. One-off peaks in demand which may result in full loads of passengers do occur but are infrequent and do not require any further consideration at this time.

Case study - Islay

At the last Census (2011) the population of Islay and Jura was 3,424 of which all but around 220 live on Islay. This represented a decline from 2001 but the study work for the VR&DP 2015 report noted that there were signs that this decline had been halted and that the number of residents may be beginning to increase. This will be facilitated by increased housing supply – there has been approval for 180 houses at Bowmore, 50 of them affordable, with 30 already under construction.

The population profile is relatively elderly with 39% aged 55 and over, compared to 30% for Scotland as a whole, of which 23% are 65 or above. Older residents tend to make fewer ferry trips that younger people. The island has a relatively low share (30%) of the population in the main economically active age group (16-44), compared to 39% for Scotland; however, a high-level (69%) of the population aged 16-74 are economically active, with high levels of full-time employment and low unemployment.

Economic activity on Islay differs from Scotland as a whole in a number of respects which have an impact on ferry services:

- employment in the Primary (e.g. agriculture, fishing) and Production sectors is significantly above average. According to NFUS calculations, farming contributes £11m to the island economy;
- the manufacturing share of total employment (14%) is significantly higher than for Scotland as a whole (8%) reflecting the role of whisky production. The Bruichladdich Distillery is the largest private employer on the island with 75 employees and expects to recruit more as part of its expansion plans which will lead to increased freight traffic on the ferries in both directions.

- 21% of the economically active are self-employed which is almost double the Scottish rate;
- accommodation and food service employment (11%) is higher than the Scottish indicating the relative importance of tourism;
- construction is slightly higher than the Scottish average and will tend to peak and trough – however various projects including new housing, new hotels and planned distillery expansion are likely to maintain strong demand for construction freight traffic.

The strong manufacturing base supports the evidence of strong demand for freight traffic, with the route accounting for over 20% of CalMac's shipped commercial vehicles compared to less than 5% of passengers. Further growth is forecast; this remains associated mainly with the whisky industry, with expansion of bottling and packaging at one of the leading distilleries, and construction. This growth may also outstrip the capacity of the island's livestock farms to absorb the vegetable waste from the distilleries, which will produce a further shipping requirement if other uses are not developed. Gin production is also growing rapidly (70% last year; 50% forecast this year) reflecting a booming global market which is expected to remain robust even once "fashion" moves on. Renewable energy projects seem to be developing more slowly than previously indicated but could become a more meaningful factor, in terms of ferry traffic demands, in the next decade. Import and export flows, in terms of commercial vehicle numbers, is perceived to be roughly balanced with slightly more lorry loads leaving the island – though this seems likely to change as bottling increases ("unpackaged" bottles and boxes take up more space than when "packaged").

Similarly, tourism traffic is forecast to continue to increase; whisky and wildlife (including to RSPB reserves) tourism have been identified as key drivers of a sector which is also becoming less seasonal than in the past – which makes accommodation and food services more viable year-round as well as making more productive use of ferry capacity outside the main holiday periods. Growth in tourism has placed pressure on the availability of accommodation particularly during special events and festivals – however there has been a market response to this with 2 new hotels under construction adding 61 more rooms.

Demand for ferry deck capacity is increasingly seasonal both from tourists (cars and motorhomes) and freight users: the traditional 'silent season' for distilleries is less of a feature than in the past although the peaks of demand are still largely outside the main summer holiday period. As in the wider economy, firms are carrying less stock and relying more heavily on repeated flows of goods in and out.

Freight users are highly dependent upon the ferry although there are some exceptions to this:
- liquid fuel imports through the Council pier at Bruichladdich;
- some but not all grain for the distilleries by freight ship through the "grain berth" at Port Ellen;
- around half the materials for a major construction project on Jura came via lift-on lift-off freighter at Craighouse pier.

Based on this background data, the VR&DP 2015 report is based on estimates of sustained growth of all traffic types with particularly strong growth in cars and commercial vehicles. As a result, the trend of capacity utilisation levels is forecast to increase, although with a slight reduction between 2015 and 2016 due to the provision of additional capacity through a greater number of sailings by both MV Finlaggan and MV Hebridean Isles.

As demand continues to grow in the medium to long term vehicle capacity constraints will begin to reach levels where a significant number of customers will be unable to travel. Amongst the major vessel services, Islay faces a particular challenge with the infrastructure at Kennacraig,

Port Askaig and Port Ellen only able to accommodate a vessel of up to 90 metres, the size of the current 'primary vessel', the MV Finlaggan. Only 4 of 10 current major vessels can be accommodated and other that the Finlaggan these are all at least 30 years old and therefore approaching the end of their normal working lives.

The Islay ferries also provide the main connection to Jura (via Port Askaig) as well as a link to Colonsay which is highly valued by the residents there as a complement to the island's main link to Oban and to enable "island-hopping".

Therefore an assessment will be carried out of short to medium-term options for serving Islay. This will include potential port infrastructure upgrades as well as vessel options. The provision of services for freight users will be considered given the unusually high level of freight usage on this route and the freight-carrying limitations of the current 'second vessel', the MV Hebridean Isles. This assessment will be carried out in consultation with the community and will aim to report in the first half of 2017.

9 RET NETWORK-WIDE ROLL OUT

91. The next Annual Report (for 2016) will be the first to capture the actual impacts of RET pricing applying on all CHFS routes. For this 2015 Report the Major and Non-Major spreadsheet models included an estimate of the likely changes in passenger, car and coach demand following the final phase of the RET roll-out.

92. Previous forecasts of demand changes arising from the new pricing structure were based on elasticity values derived from the RET 'pilot' routes assessment. These 'pilot' routes were the longer routes in the network and all of them were reservable for vehicles. The most recent routes were largely shorter, higher frequency routes which, unlike the pilot routes, have a significant day-trip profile of demand. This suggested that demand on the 'late' RET routes was more responsive (elastic) to price reductions than the pilot routes. This differing make-up in the pattern of demand has seen increases approaching 90% in some cases.

93. An analysis of the changes in demand on the late RET routes is shown below. The percentages reflect the changes in demand post RET roll-out. (Note that Ardrossan-Brodick and Claonaig/Tarbert-Lochranza commenced RET in October 2014 – this was 12 months earlier than the other routes shown.)

Emerging changes in demand on 'late' RET (all 'late' routes)

Category	RET from	Route	Passenger increase to July '16	Car increase to July '16
Major	October 2014	**Ardrossan-Brodick***	13%	53%
Small	October 2014	**Claonaig/Tarbert-Lochranza***	43%	62%
Major/Medium	October 2015	**Oban-Craignure**	15%	45%
Major/Small	October 2015	**Mallaig-Armadale**	9%	22%
Medium	October 2015	**Mallaig-Small Isles**	12%	69%
Medium	October 2015	**Wemyss Bay-Rothesay**	5% (estimated)	25% (estimated)
Small	October 2015	**Barra-Eriskay**	23%	30%
Small	October 2015	**Berneray-Leverburgh**	12%	21%
Small	October 2015	**Colintraive-Rhubodach**	10% (estimated)	20% (estimated)
Small	October 2015	**Fionnphort-Iona**	16%	25%
Small	October 2015	**Largs-Cumbrae Slip**	10%	18%
Small	October 2015	**Lochaline-Fishnish**	0%	0%
Small	October 2015	**Oban-Lismore**	16%	52%
Small	October 2015	**Sconser-Raasay**	14%	20%
Small	October 2015	**Tarbert-Portavadie**	38%	45%
Small	October 2015	**Tobermory-Kilchoan**	31%	83%

*** - Based on 2 years of RET**

94. For the two Arran routes, which commenced RET in October 2014, the change in demand was spread over two years as follows:-

Arran routes: RET changes in demand

	Passenger Changes			Car Changes		
	Year 1	Year 2	Year 1 + 2 compound growth	Year 1	Year 2	Year 1 + 2 compound growth
Ardrossan-Brodick	5%	7%	13%	40%	10%	53%
Claonaig/Tarbert-Lochranza	25%	15%	43%	40%	15%	62%

95. If this second year uplift is repeated on the routes which commenced RET in October 2015 this would point to a number of routes in summer 2017 undergoing a further, albeit smaller, change in demand.

10 PORTS

10.1 Major and Non-Major Vessel Ports/Harbours

96. In order to deliver the Vessel Replacement and Deployment Plan a number of ports may require modification to support the delivery of such a programme. For the ports which will be served by the new 100 metre vessels this process is well underway with ports either under construction or at the design development phase.

97. CMAL are the major provider of port and harbour facilities for the CHFS services with 24 locations (just under half of the total) in their ownership. Of the other ports and harbours utilised in the provision of CHFS services, Local Authorities account for 21 sites with Harbour Trusts, private owners and other bodies accounting for the remaining 6.

11 EMERGING CONCLUSIONS

98. As set out in paragraph 8, the VR&DP is founded upon:-

a) The Routes and Services proposals set out in the Ferries Plan (2013-2022)
b) The capacity and demand analysis set out in this Report
c) The need to replace vessels as they reach the end of their working life

11.1 Major Vessel Routes

99. The VR&DP Annual Report 2014 recommended the procurement of 2 major vessels for initial deployment on the service to Brodick and the Uig-Tarbert/Lochmaddy routes. It also modelled an indicative program of acquisitions, cascades and disposals for the period up to 2025 featuring a further 4 new major vessels to replace vessels reaching the end of their working life.

100. With 2 new 100 metre vessels already under construction and due for delivery in 2018 the 2015 analysis has identified areas which need to be considered further as follows.

101. The peak-season capacity pressure on services to Brodick and Tarbert/Lochmaddy will be partly mitigated by the delivery of the new vessels. Pressure on Islay services will be partly mitigated by additional sailings.

102. The deployment of the new vessels will also displace 2 existing vessels:-

a) The VR&DP 2014 report set out the intention that the MV Hebrides would be cascaded to Oban-based services. Whilst final decisions on the deployment of vessels rests with CFL, this assumption remains valid
b) The new vessel arriving on the Arran service will replace MV Caledonian Isles as the 'primary vessel' on the route. It will be for CFL to decide how to provide the 'second vessel' services on the route (including the link to Campbeltown)
c) The expectation is that the arrival of the 2 new major vessels will allow at least one of the existing ageing vessels in the fleet to be released from scheduled service

103. The analysis in Section 8 sets out the routes facing the most peak-season pressure. By 2019, the first full summer following the delivery of the 2 new major vessels, the routes forecast to have the highest capacity utilisation during this 9-week period are:-

a) Oban-Craignure (91%)
b) Stornoway-Ullapool (75%)
c) Islay services (74%) and
d) Uig-Tarbert/Lochmaddy (68%)

11.1.1 Oban-Craignure Service

104. This route remains a challenge and options for increasing capacity are required. The 2016 current peak-season timetable as delivered by the dedicated vessels MV Isle of Mull and MV Coruisk enabled vehicle deck provision to rise from 5,750 PCUs (Passenger Car equivalent Units) per week to 7,100. According to our modelling 9,000 PCUs per week would be required from 2018 in order to bring average peak season weekly capacity utilisation down to 70%. This would

require, for example, 2 vessels with the vehicle deck capacity of MV Isle of Mull operating to the 2016 timetable.

105. As noted above MV Hebrides is due to become available in 2018. She would bring significant additional capacity to the major vessel fleet.

11.1.2 Services to Islay

106. Forecast peak season demand can be addressed in the first instance through increased sailings (subject to assessment of additional costs). The challenge for Islay services is different: as noted in the VR&DP 2014 report, the infrastructure at Port Askaig and Port Ellen can only accommodate a vessel of up to 90 metres. Whilst MV Isle of Mull satisfies the maximum length criteria, the lack of an open vehicle deck - a requirement for the carriage of dangerous goods (mainly spirits on this route) - precludes this vessel's deployment. This leaves 4 out of 10 of the current major vessels which can be accommodated:

- the MV Finlaggan (the current 'primary vessel')
- the MV Hebridean Isles (the current 'second vessel')
- the MV Isle of Arran and
- the MV Lord of the Isles

107. An assessment will be carried out of short to medium-term options for serving the route between the mainland and Islay. The provision of services for freight users will be considered given the unusually high level of freight usage on this route, in connection with the whisky industry, as well as the more regular freight usage typical of other islands and the freight-carrying limitations of the MV Hebridean Isles.

108. This can lead into a longer term assessment of infrastructure options and a consideration of vessel length limitations.

11.1.3 Ullapool-Stornoway and Uig-Tarbert/Lochmaddy Services

109. Demand is forecast to continue to grow on both the Stornoway-Ullapool and Uig-Tarbert/Lochmaddy routes. The new vessel to be deployed on the latter will bring some improvement but, as was noted in the VR&DP 2014 route, was not expected to be a long-term solution. There are long-standing aspirations in both communities for a two-vessel service or separate services to be introduced and the case for a two-vessel Stornoway-Ullapool service is also being made (either a separate freight vessel or a second vehicle-passenger vessel). There are currently 5 routes serving the Outer Hebrides from 4 mainland ports plus 2 internal services across the sounds of Barra and Harris. There are inter-relationships between these services and the potential displacement effects of (for example) the introduction of the MV Loch Seaforth, the introduction of the Mallaig-Lochboisdale service and the future deployment of the new vessel to the Uig services needs some consideration.

110. We therefore propose to carry out a STAG (Scottish Transport Appraisal Guidance) assessment of all the routes to/from and within the Outer Hebrides to consider those that are evidencing high levels of capacity utilisation and those that experience poorer than expected reliability. Given this is more complex that a simple single-route STAG, we intend to pursue this work over a longer timeframe, in the manner of the recent STAG exercise undertaken for the Northern Isles. In order to plan and resource this work effectively, it is therefore proposed that this exercise commences following the completion of the Islay exercise referred to above –

provisionally mid-2017. The exercise will be medium and long-term in scope with a view to bringing forward conclusions in 2018.

11.2 Minor Vessel Routes

111. The analysis in Section 8 sets out the routes facing the most peak-season pressure. In general there is forecast to be less pressure on the minor vessel fleet than the major vessel fleet though with a couple of clear challenges highlighted. The routes forecast to have the highest capacity utilisation during this 9-week period in 2016 are:-

a) Mallaig-Armadale (87%)
b) Berneray-Leverburgh (71%)
c) Barra-Eriskay (57%)

11.2.1 Mallaig-Armadale:

112. This route remains a challenge: the model forecasts are based on the 2016 vessel deployment (a combination of the MVs Lord of the Isles, Lochinvar and Loch Bhrusda); the deployment of the MV Coruisk instead would not provide additional capacity. The infrastructure at Mallaig harbour, like many on the CHFS network, limits the number of current vessels which fit the port and which have the necessary manoeuvrability – currently the largest vessel to use the port is the MV Lord of the Isles (85m). This also becomes a factor in determining future vessel provision for services to Lochboisdale. Mallaig Harbour Authority has commissioned a major "masterplanning" exercise into future shoreside infrastructure options which will also have an impact on long-term planning.

11.2.2 Berneray-Leverburgh (Sound of Harris) and Barra-Eriskay (Sound of Barra)

113. These routes provide useful and increasingly popular connections within the Outer Hebrides but face some particular challenges:-

a) The waters crossed by both routes, and the Fionnphort-Iona service, have recently been reclassified by the MCA and any new vessel will require to be built to a higher technical and operational standard ("Euro B") than was the case previously ("Euro C"). This means that, for example, the new hybrid vessels recently introduced to the fleet could not be deployed on these routes
b) The Sound of Harris services is tidally restricted and can only operate in daylight which, taken together, means some severe timetable limitations in winter, inhibiting connectivity within the Outer Hebrides
c) At certain heights of tide, the angle between the ramp on the loch-class vessels and the concrete slips can prevent the loading of long, tri-axle coaches, or create the risk of grounding. This can also affect some HGVs
d) The vessels operating on the Sounds – the MV Loch Portain and the MV Loch Alainn - are 13 and 19 years old respectively.

114. There are no straightforward answers to these challenges – any solution is likely to require some significant investment in vessels, infrastructure or both – and we therefore intend to cover these routes in the STAG assessment for the Outer Hebrides referred to above.

115. The small vessel fleet is being progressively upgraded. Three routes have benefitted directly from the delivery of the 3 new hybrid ferries (the MVs Hallaig, Lochinvar and Catriona) and there have been cascade effects with Oban-Lismore now being served by MV Loch Striven in place of the smaller MV Isle of Eigg. There are further cascade opportunities for CFL following the recent arrival of the MV Catriona.

116. We will continue to invest in the small vessel fleet as funding permits.

11.2.3 Looking Further Ahead

117. At the network wide level there is a need to consider all options of how the Ferries Plan commitments, future capacity requirements and the ageing fleet can be addressed. Some of these items fall outwith the scope of this report, however, they will have a bearing on the future supply of capacity. Areas which will be considered further include:-

a) Service frequencies
b) Current fleet deployment
c) Charter and second hand vessels
d) Demand management

118. New build options will continue to be considered and plans developed, however, at least for the next few years this is likely to be against a backdrop of increasingly tight public spending.

119. CMAL and CFL will continue to survey world markets for opportunities to bring second-hand tonnage into the fleet, whether by sale or charter. Unfortunately, these opportunities have historically been very limited. There are a number of reasons for this which include:-

a) Many of the harbours used for the CHFS services can only be used by vessels of a relatively small size, particularly in terms of draught, which is why CFL vessels have traditionally been purpose-built for the network
b) The weather and sea conditions off the west of Scotland present particular demands: that impacts on the MCA's designation of these waters and that in turn impacts on the class of vessels allowed to sail on them; ferries of the required size built for other locations will be designed with those locations in mind and may not be able to deal with the conditions here

120. CFL and CMAL are also exploring options for vessel life-extensions – these will include options for vessel modifications which could increase their carrying capacity. The benefit of this approach is that work can be undertaken much more quickly and at considerably less cost than a new-build project. However, there are limits to how long a vessel can be kept in service even following this kind of substantial investment. Also, it would require a vessel to be either surplus to operating requirement or to be taken out of service for several months so that work could be undertaken.

11.3 Way Forward

121. As set out above, further work will be undertaken to inform future vessel replacement and deployment decisions. This will prioritise:-

- Oban-Craignure short and medium term options
- Mallaig-Armadale short and medium term options
- Long-term options for the routes to, from and within the Outer Hebrides including the Sounds
- Short, medium and long-term options for Islay.

12 ACTIVITIES FOR 2016

12.1 Annual Review 2016 - Re-run of demand/capacity Model

122. It is the continued intention of Transport Scotland, CalMac Ferries Limited and Caledonian Maritime Assets Limited (the tri-partite) that this Vessel Replacement and Deployment Plan will be kept under annual review.

123. The review of 2016 will include an updated model to reflect the changes made with the Oban to Castlebay and Oban/Mallaig to Lochboisdale services. It will also include carryings data for the summer of 2016 therefore capturing the first full summer of RET across all routes.

124. Updated independent forecasts of demand will be produced to inform future volumes. These will include a further 'deep-dive' analysis of one third of the network.

12.2 Tri-partite Meetings

125. The program of monthly tri-partite meetings between Transport Scotland, CalMac and CMAL has continued into 2016 and will remain in place for 2017. Agenda items will include the following:-

a) The on-going construction of the two 100 metre new build vessels
b) Infrastructure requirements for the new build vessels
c) An exploration of options to address the demands on the routes with capacity constraints
d) Review of the 2016 demand/capacity model outputs
e) The longer-term vessel and port strategies
f) On-going review and re-assessment of core assumptions
g) Life extension of vessels

13 GLOSSARY & ACRONYMS

CFL	CalMac Ferries Ltd
CHFS	Clyde and Hebrides Ferry Services
CMAL	Caledonian Maritime Assets Ltd
CV	Commercial Vehicle
HGV	Heavy Goods Vehicle
LGV	Light Goods Vehicle
LNG	Liquefied Natural Gas
MV	Motor Vessel
PCU	Passenger Car equivalent Unit
RET	Road Equivalent Tariff
STAG	Scottish Transport Appraisal Guidance
TS	Transport Scotland
VR&DP	Vessel Replacement and Deployment Plan

Appendix 1 – Capacity Utilisation Explained

Capacity Utilisation Explained

Capacity utilisation is a measure of the capacity supplied and the volume of demand utilising it. For the ferry operation, this translates to the carrying capacity of the vessel and the number of passengers and vehicles actually carried. Whilst capacity utilisation can be measured on a sailing-by-sailing basis, it is more widely used over a week. The calculation then becomes the total volume carried in a week divided by the total capacity provided in the week.

Capacity utilisation is expressed as a percentage – the following example illustrates:-

- Number of cars carried in week 500
- Vessel capacity (based on PCU*) 100
- No. of sailings in week 10
- Capacity Utilisation (weekly) 500 / (100*10) = 50%

*PCUs – Passenger Car equivalent Unit; a homogenised metric applied within traffic capacity and flow analysis, reflecting the various types of vehicle carried by ferry.

In many forms of transport weekly capacity utilisation seldom reaches anywhere near 100%. This is for a variety of reasons:-

- Daily flows – demand is not uniform across the day
- Weekly flows – during the peak season when demand is at its greatest
- Weekend flows - demand to and from many islands can increase on Fridays and Mondays as weekend activity feeds demand on these days
- Annual flows – Short breaks and annual holidays combined with the popularity of the west coast islands as a holiday destination results in significant peaks in demand in the height of the summer

In addition to the above the method that CFL uses for recording vehicle deck loadings can have a bearing on the capacity utilisation figures for the following reasons:-

- Broken stowage – caravans and motorhomes are generally recorded as cars in the CFL stats system. With the aforementioned vehicle types being wider than cars it is likely that a caravan will occupy an area greater than that of a family car. Where the vessel, or parts of the vessel, is two car lanes wide, one caravan can easily encroach into a second vehicle space and occupy the space of two cars (as there is no room for another car alongside the caravan). The recorded stats do not reflect this
- Lashed Commercial Vehicles – when commercial vehicles are lashed to the deck, the effective footprint of the vehicle is increased, as empty space around the vehicle may be inaccessible due to the lashings. The recorded stats do not reflect the lost space

- Vehicles conveying mobility impaired passengers – often require a greater space around the vehicle either for vehicle doors to be fully opened for ease of access, or, for a wheelchair to be used
- Hazardous Goods – certain categories of hazardous goods require a 'blast-zone' around them i.e. a space in which no other vehicle can be carried. The stats recorded by CFL do not take the additional space occupied by such vehicles into account
- Deadweight limit reached – A number of the CFL vessels can be full by cargo weight, but still have space available on the vehicle deck. In the stats records the vessel will show as still having space available, however, the reality is that nothing further can be accommodated

Anecdotal evidence suggests that, for the CHFS network of services, 70% weekly capacity utilisation is around the point that demand starts to become significantly constrained. For reservable services this manifests itself with customers being unable to secure a reservation on a suitable sailing – invariably leading to a complaint about not being able to get a reservation. It is likely that there will be some variation across the routes and at different times of the year, however, a central assumption of 70% has been used for the purpose of our analysis.

For the avoidance of doubt many individual sailings in the CHFS network sail at 100% capacity utilisation with instances in July far outweighing those in December. Full sailings can occur frequently in the winter months especially after periods of adverse weather when back-logs of traffic can occur.