



CF BRAMBLE BUSH BAY Planned Maintenance & Replacement Costing Rev 0 BCP/J/10889/06

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1 Introduction

Burness Corlett & Partners Ltd (BCP), now Burness Corlett Three Quays (Southampton) Ltd (BCTQ), have acted as maritime consultants to The Bournemouth & Swanage Motor Road & Ferry Co. (BSMRFCo.) during the design and construction of the 74m chain ferry 'BRAMBLE BUSH BAY' and have previously been requested by the Owners to provide advice and estimate costs to the following points:

1. What is the likely current cost of replacing the CF 'BRAMBLE BUSH BAY' as is?
2. As 1. above, but with diesel electric rather than diesel hydraulic drive?
3. When and why is it considered that this may be necessary?
4. Advise on the likely variation in shipbuilding costs in relation to inflation in the short, medium and long term for a craft of this type and size.
5. What is the likely current cost (both financially as well as in time) of replacing any major items in the engine room, what are they, why may they need to be replaced and when?
6. As 5. above, but with electric rather than hydraulic drive?
7. Advise on the likely variation in ship repair costs (in particular for items such as 5. or 6. above) in relation to inflation in the short, medium and long term.
8. Provide key points of the advantages and disadvantages of both diesel hydraulic and diesel electric drive systems, as could be installed in a chain ferry.
9. Does the new build cost include professional fees?

The purpose of this report is to provide updated recommendations and costing to the points above.

All costs shown are net prices, exclusive of VAT.

2 Background

Following the preparation by BCP (now Burness Corlett Three Quays) of the design and specification for this craft, the shipbuilding contract was placed in January 1993, the completed craft 'BRAMBLE BUSH BAY', entering service on the Sandbanks – Studland service in late January 1994.

3 Response to Specific Points

The following response is made to the points listed in Section 1:

3.1 Replacement Cost

Based on recent known costs and an extrapolated method of costing for new build steel vessels of similar size and functionality, to replace the existing craft, assuming an order is placed during the first quarter of 2019 with a UK shipyard the estimated cost would be circa.....**£8.44m**

3.2 Replacement Cost with Diesel Electric Drive

As existing craft but with electric drive – order is placed during the first quarter of 2019 with a UK shipyard the estimated cost would be circa.....**£9.79m**

3.3 Economic Life

The existing craft entered service in the first quarter of 1994, i.e. the craft is now 25 years old. Whilst the working life of chain ferries has been longer historically than conventional ferries, the ultimate economic life of a chain ferry will be affected by:

- The maintenance regime operated
- Obsolescence of equipment
- Carrying capacity of craft unable to meet traffic demand
- Changes to statutory requirements governing chain ferries

The existing craft is well maintained and has undergone scheduled maintenance including annual 'in service' refit and dry-docking every two years. In 2014 Lloyd's Register permitted the dry-docking cycle to be extended to every five years with the 'in service' refit continuing in the interim years.

Based on the currently maintained condition of the hull structure compared to steel vessels of similar age, the craft should be capable of a further 15 years' service, providing protective coatings are maintained/renewed as found necessary and taking into consideration the extended time between dry-dockings.

The three diesel prime movers underwent a major overhaul in 2012 and subject to the future availability of spares the engines should be serviceable for another 15 years and this would also be subject to any future regulatory emission requirements.

At present the existing craft provides the largest platform in terms of length and breadth that can be accommodated on the service.

Should vehicle demand increase to the point that the existing craft cannot carry the available traffic and result in the adverse effect of diverting potential traffic away from the ferry, then

consideration will have to be given to either increasing the capacity of the existing ferry, or building new tonnage.

At the time of commissioning 'BRAMBLE BUSH BAY' was the largest chain ferry to enter service (with others also under construction) and a number of features relating to stability, lifesaving and navigational safety were built into the craft that formed the basis for the then new MCA regulation for chain ferries later introduced in 2002, '*Code of Practice for the construction, machinery, equipment, stability and operation of Chain/wire ferries acting as a Floating Bridge, carrying passengers and vehicles*', which was last revised in January 2018.

It was not until the 2018/19 refit that the MCA required the craft's structural fire protection to be upgraded to meet the relevant regulation in the code and for the stability to be reviewed after 25 years' in service.

Unless new environmental/pollution control regulations, for example, reduced emissions, reduced noise, or further safety requirements are imposed on chain ferries within the next 10 to 15 years, then it is not envisaged that any major modifications will be necessary for compliance with the current MCA code, subject to any future amendments arising.

On the basis of the above, it is considered that the existing craft could be expected to have an economical service life of between 35 to 40 years and hence the replacement of the existing craft should not be necessary until 2029 to 2034.

3.4 Variations in Shipbuilding Costs

Since the 'BRAMBLE BUSH BAY' was built in 1993/4, the number of shipbuilding yards in the UK of the size and with the necessary experience to build this type of craft would likely to be as follows:

- Fergusons
- Cammell Laird
- Pendennis Shipyard
- Southampton Marine Services / Wight Shipyard – (sister companies)

These yards are identified as having the capability to undertake new commercial build projects, it is likely that in order to obtain competitive prices, quotations from shipyards in Europe would also need to be considered.

New Build prices in UK and Europe are affected by the following factors:

- Exchange rates
- Steel prices
- Energy costs
- Overhead and labour costs

Factors which favour a reduction in prices for UK (and Europe) are fall in demand, current exchange rates (for UK - pound falling against Euro) and reduction in steel prices. Offsetting these factors are higher energy, overhead and labour costs.

Other factors to consider to optimise costs for building a replacement chain ferry, would be contracting with a UK shipyard, responsible for the complete ferry, but subcontracting the hull construction to a European Yard and outfitting back in the UK (as was the 2006 built replacement King Harry Ferry) may be given.

This option has the advantage of obtaining a more competitive hull construction cost, whilst maintaining quality, reputation, local facilities and associated advantages of a UK build.

However due to the specialized nature of a chain ferries, the following factors will also need to be considered when selecting a shipyard:

- Chain ferries are not self-propelled, they require to be transported (usually towed) from the shipyard to the point of operation (e.g. shipyard to Sandbanks).
- In order to fully test a new ferry's operation, the propulsion chain drive, machinery and hydraulics, it is necessary to connect them to their chains (e.g. at Sandbanks)

Thus it can be expected that for these aspects, the contract costs and delivery time for a build by a North Eastern Europe shipyard will be higher when compared to UK yard.

Since a replacement new building is unlikely to be imminent, any effect Brexit might have replacement costs would be highly speculative depending on what assumptions were made but for such a specific vessel, the chance of a fall in replacement cost is unlikely.

3.5 Replacement Cost of Major Machinery Items

As anticipated, in 2012 the craft started to undergo a planned maintenance programme as part a '20 year life extension' refit.

To date the main areas of renovation work so far have included:

- Engines - in 2012 the three Cummins engines were completely rebuilt at a cost of £22,444 per engine, total cost of £67,332.
- Hydraulic Motors – in 2016 one of two hydraulic motors was replaced at a cost of £26,846
- Deck - the main deck has been stripped back and re-coated.
- Prows – the prows have undergone extensive work that included the re-bushing of the hinges.
- Tanks - four tanks were re-coated in 2014 at a cost of £17,307 excluding services i.e. venting, air quality testing and lighting.
- Structural Fire Protection - in 2018/19 additional fire insulation was fitted at the request of the MCA at a cost of £55,000.

To prolong the craft's serviceable life it is recommended that a maintenance programme is continued in accordance with Class and MCA requirements.

Whilst the hull of a chain ferry is relatively easy and economical to maintain in terms of maintaining and renewing the anti-corrosion coatings, the chain drive machinery is subject to a high degree of wear and tear particularly in respect of the chain wheel hydraulics.

To minimise the period out of service this work is mainly internal which is not necessarily weather dependent and therefore can be completed during the interim 'in service' refits and at the next scheduled dry-docking in 2022.

The estimated of cost for a 'life extension refit' during this period up to the next dry dock would cover:

- Renewal of the hull void space (internal) coatings.
- Chain drive machinery.

Completed in accordance with a Lloyds Register 'Hull Renovation Scheme (HRS)' which aims to help enhance the condition of the hull condition to approximately that of a typical vessel at first special survey (5 years of age)

Estimated costs to prepare and recoat the hull (internal) void spaces.....**£315,000**

For the Diesel prime movers, now that the craft has two units driving the hydraulic units and one 'spare' engine, it should be feasible to rotate the three engines to carry out routine maintenance.

Should the engines require to be overhauled then the costs per engine at today's prices would be in the order of £27,000, giving a total cost of £81,000.

Depending on the overall condition of the Diesel engines and the total hours run, considered in relation to the projected total life extension required for the craft, it may be economically beneficial to fit replacement engines.

It is envisaged that providing no major reworking of engine seatings or exhaust runs are necessary, costs would not be very different to the heavy overhaul option.

A replacement for the other hydraulic drive motors would become necessary at some time and the cost to do so at today's prices would be in the order of £30,000.

3.6 Replacement Cost of Diesel Electric (if fitted at build)

Had the craft been fitted with a Diesel electric installation at build, it is envisaged that machinery work at the time of the 'life extension' refit would comprise the overhaul/replacement of the Diesel prime movers at cost circa £81,000.

3.7 Ship Repair Costs

The UK ship repair industry has been considerably down sized and finding competent companies with the necessary facilities for this size of craft is becoming difficult.

The general reduction in the number of competing repairers has resulted in those remaining, increasing their prices slightly above the rate of inflation.

Docking with other vessels in a large dock is one way of containing these costs, but this is not guaranteed and may result in extended docking periods.

Currently A & P Falmouth offer the only suitable dry-docking facility that serves the purpose for refits on BRAMBLE BUSH BAY and many other ferry operators on the UK south coast.

In the long term, it is necessary to allow escalation averaging at least at the rate of inflation.

To the current normal dry-docking refit cost of £30,000 to £40,000, plus daily rent of £350, which must be added the costs of removing the craft from the chains and towage to and from the ship repair yard, classification survey fees, docking and mooring charges, professional fees, additional repairs and emerging work, which could easily double the cost of a refit.

In terms of the craft's future repair and maintenance being undertaken in the UK, then Brexit should not have much impact on these costs unless there are critical spares coming from Europe. Any increase in cost due to a fall in sterling/euro rate falls further might only be short lived and should recover.

As a relatively uncomplicated craft it would be beneficial for the interim refit work to continue to utilise in-house staff, local contractors and manufacturer service engineers who provide a competitive service.

3.8 Advantages/Disadvantages of Diesel Hydraulic & Diesel Electric

Diesel Hydraulic

For

- Lower first cost
- Lower installation weight

Against

- Limited flexibility of operation
- Reduced reliability
- Higher maintenance costs
- Risk of contamination
- Risk of higher installation noise

Diesel Electric

For

- Total flexibility of operation
- Higher reliability
- Lower maintenance costs
- Equipment longevity
- Low noise

Against

- Higher first cost
- Higher installation weight

3.9 Professional Fees Cost

Professional fees for a new build, covering the following:

Pre Contract:

- Invitation to Tender
- Instructions to Tenderers
- Specification
- General Arrangement Drawing
- Machinery Arrangement Drawing
- Technical Schedule
- Assessment of Shipbuilders' Tenders
- Pre-Contract Technical & Commercial Discussions

Post Contract:

- Project Management
- Attendance at Project /Progress Meetings
- Plan Approval
- Supervision of Construction
- Attendance at commissioning and trials

It is has been assumed that the Post-Contract Services would be provided on a periodic basis (similar to that for the Bramble Bush Bay).

The professional fees will be dependent on location of shipyard, duration of build, but is estimated the likely cost in 2019 would be circa.....**£273,000**

Classification and MCA costs already included in build costs.

4 Conclusions

The chain ferry 'BRAMBLE BUSH BAY' is currently being maintained to the necessary standard to ensure both safe and reliable operation, thereby maintaining the scheduled service across the entrance to Poole Harbour.

If this standard of service reliability is to be retained in the future, it will be necessary to continue to maintain and refit the craft to the existing standard and where items of equipment become life expired for these to be replaced.

In the near future the likelihood is that some additional consideration will be required as to how any new safety or environmental regulations could be imposed on marine vessels, including chain ferries, and how this could impact the operation of the existing craft, future refit work or eventually the design for a new replacement craft.

Therefore until any future regulations are known it is currently not possible to quantify how these could affect the planned costings within this report.