c. 1895 SL Lady Elizabeth		Potentially	Yes	Yes	4.5/6	Steam vessel	The exceptional materials, design and build of this graceful and original little vessel make her extremely special. Some features suggest a former life as a luxury yacht tender. Her Lune Valley boiler is very significant.
c. 1904 Yacht tender MV Rigmaden		Potentially	Yes		3.5/5	Motor-boat	Used near Kirby-Lonsdale, this early motor-boat is beautifully built and may be of national significance as one of the earliest British motorboats.

Vessel	International	National	Regional	Local	Score *	Group	Brief vessel description
1224-1300 Wasdale Beck Logboat			Yes	Yes	3	Logboat	One of very few found in the Lake District, this very early craft is a fascinating example of basic dugout technique.
c. 1890 Brockbank's rowing boat			Yes	Yes	3	Rowing boat	This stunningly beautiful and extremely high quality skiff was finely crafted by a local boatyard for a wealthy lake user.
Vessel	**International**	**National**	**Regional**	**Local**	**Score ***	**Group**	**Brief vessel description**
Late 19th/20th Century Otto's tender				Yes	1	Sailing boat	This small tender was found in Otto's former dock.
Ice yacht, late 19th/20th Century				Yes	1	Ice yacht	Ice yachts were one of the more adventurous aspects of lake transport during periods such as the great freeze of 1895.
19th/20th Century Workboat, unknown origin					0.5?	Rowing boat	This basic flat-bottomed work boat is a striking contrast to the higher specification vessels in the collection.
19th/20th century. Unknown hull				Potentially	0.5?	Sailing boat?	The lines of this unknown hull suggest a fast yacht. This will be a fascinating area for future research.
c. 1920 Hardman dinghy				Yes	1	Sailing boat	It is hard to believe that this beautifully crafted double diagonal dinghy was built by someone who had not built a boat before.
c. 1923 MV Lollipop				Yes	1	Motor-boat	This Borwick's of Windermere boat was possibly used for public hire.
1930 MV Penelope II				Yes	1	Motor-boat	Penelope is a motor vessel in the form of a traditional steam launch. She represents an important transitional phase on Windermere.
1934 Yacht Dawn				Yes	1	Sailing boat	One of the most original of the special and much-loved 17ft Windermere class vessels, Dawn still retains her traditional sails. The class still races on the lake.
1938 MV Jane				Yes	1	Motor-boat	This stylish 'special race boat' was 'boat of the year' in 1938 and a much- cherished feature of the Windermere obsession with speed. In contrast, boats like these were used by the Windermere home front as part of the war effort.
1938 MV Raae			Yes	Yes	3	Motor-boat	Raae's elegant lines and stylish fittings make her a very fine example of 1930s motor-boat design.
c.1939-45 Short Bros Sunderland flying boat float			Potentially	Potentially	1.5/3	Aircraft part	The Sunderland factory was a well-documented part of Windermere life during World War II. Today, when Sunderlands no longer grace the lake, this surviving float indicates the true scale of these giant craft.

c 1954 Uffa Fox International Canoe,					0.5?	Sailing boat	The International Canoe, designed by Uffa Fox, is the world's fastest monohull sailing dinghy, developed from a sailing canoe designed and built by a member of Rob Roy MacGregor's Royal Canoe Club.
1959-60 MV Pyewacket				Yes	1	Motor-boat	Once owned by Norman Buckley and representative of the last phase of wooden boatbuilding on Windermere, this stylish cabin cruiser apparently had a top speed of 34mph and was used by officials at the Windermere Motorboat Racing Club.
1962 Hydroplane Cookie				Yes	1	Speed-boat	Cookie is the only survivor of three boats built as an attempt at establishing a Windermere class of hydroplane. She was capable of 85mph and still has huge visual impact.
Duck punt Anser, 20th century				Yes	1	Rowing boat	Of much interest to local visitors, the gun for this duck punt may have been made locally at Barrow.

- The full scoring system is explained in Dr Ian Friel's report but is based on assigning scores from 4 (international) to 1 (local), with halved scores where there is potential rather than full certainty of significance. In a few cases, the scores have changed from the original where we have subsequently discovered or confirmed information.

In addition to this overview, individual statements of significance are being prepared for each vessel as part of individual conservation management plans.
These statements are structured around the guidelines set down in *Conserving Historic Ships* as follows:

- What is the vessel's ability to demonstrate history in her physical fabric?
- What are the vessel's associational links for which there is no physical evidence?
- How does the vessel's shape or form combine and contribute to her function?

In doing this, we will draw on the work already in progress by National Historic Ships UK in revising the statements of significance for National Historic Fleet vessels. We will also take advice from Hannah Cunliffe and George Hogg. For the purpose of this document, the statements of significance below are set out around the relevant HLF categories from as given in guidance on Conservation Management Planning but a general statement for collection significance, orgnanised around the above National Historic Ships UK headings, will also be developed.

3.2 Historical Importance

The national significance of the collection lies in the rare survival of such a large and extremely high quality group of boats associated with one location. In significance and historic association there is no comparable group of preserved leisure boats in the UK. The link to a specific place brings coherence, and an understanding of the collection that is derived from meaningful comparisons and a wealth of contextual information. The circumstances in Windermere that led to the creation of the boats in the collection provide a special insight into the wider context of nineteenth and twentieth-century social and industrial history. The collection provides an interesting perspective on events that transformed society, from the Industrial Revolution to the two World Wars and illustrates the powerful impact of those events on local communities and their economy.

The Industrial Revolution and new wealth, technologies and transport that came from it created new leisure opportunities. Windermere was brought by the railway and later the motor car, into easy travelling distance from Manchester and other large cities and satisfied the demand for a luxury playground in an unspoilt location. The boats, their builders and their owners are at the heart of this development, but their histories also provide insight into the post-1914 decline of that lifestyle and the impact of new technologies and changing patterns of tourism.

All vessels are built for a limited lifespan – commonly about 30 years. As high-maintenance status symbols for the very rich, the launches and the racing vessels were particularly prone to degradation due to their materials, methods of construction, and the characteristics of small steam units and early internal combustion engines. The Windermere craft are therefore exceptional survivors, containing historic evidence that is of interest at a national and international level. Associated collections include exquisite decorative items that provide a striking insight into the water-borne lifestyles of the wealthy. SL *Branksome's* extravagant tasselled velvet furnishings were imported from Paris, as befitted one of the most luxurious wooden steam launches on the lake. Fine monogrammed tableware from the lost SS *Britannia* provides an evocative and moving reminder of one of the most luxurious nineteenth-century inland vessels.

Work vessels represent long-standing traditions of lake transport as well as the impact of industry on Windermere. Ferry *Mary Anne*, SS *Raven* and Sandbarge *Elizabeth* are of particular interest in this respect. The collection gives an insight into working lives and practices through a detailed study of vessel design, construction and maintenance history through physical evidence and archival records. The special features of the Windermere-built vessels, the relationship between boat designer, builder and engineer, and the mixture of 'every day' and luxury bespoke vessels in the collection make it a particularly valuable resource. The collection also reflects the social and technological developments that impacted heavily on local businesses and were indicative of wider national and international developments.

3.3 Artistic Qualities

The aesthetic qualities of the boats' lines and build have immediate impact. As graceful, bespoke creations, they combine extreme skill with the use of superior materials. Many of the vessels represent the height of sophistication in design and build, particularly fine examples among the wooden vessels are Yacht *Margaret*, all the large wooden steam launches and small launch SL *Lady Elizabeth*. Research into design influences on the collection reveals a unique combination of specific Windermere features and inspiration from elsewhere.

These vessels are evocative examples of how the design features of their era were used in a maritime context. As the epitome of Victorian taste, *Branksome* perfectly reflected the glamour of her owner's new lakeside home and seamlessly carried the Victorian drawing room aesthetic out onto the water. In contrast, other boats are redolent of a more streamlined 1930s look: *White Lady II*, Yacht *Dawn*, MV *Penelope*, *Raae* or *Jane*, for example. Overall, this large group of sophisticated vessels can be understood in the surviving context of their original lake 'villas' and boathouses to create a coherent and nationally significant design resource.

The collection showcases boats built for the best possible hydrodynamic movement through the water, streamlined for planing and engines designed for the ultimate technical performance. The precision engineering that made engines by Sisson of Gloucester so effective also carries a strong visual appeal and the engines are as attractive for their formal qualities as for their function.

Current visitors to the Museum respond to the beauty of the boats' lines and the sculptural qualities of boats and engines, even in their existing setting. They are drawn to the evidence of skill and dedication, the rich variety of materials, textures and surfaces and the mixture of shipshape shine and patina of age.

3.4 Archaeological Significance

The collection holds a number of rare boats and remains of archaeological significance. They provide an important insight into early boatbuilding techniques and materials.

The Kentmere logboat shows technical developments that are of international significance and provides a fascinating insight into the work processes, tools and resources of its fourteenth century builders. It is by far the better preserved of the only two known surviving Kentmere vessels. The Wasdale Beck boat is of considerable regional significance but, as an example of common dugout construction, also provides valuable insight into early boatbuilding techniques. The 1745 fragment and 1780 yacht are currently the focus for further research, but, as two of the earliest surviving leisure sailing vessels, are of national, even international importance.

Of national significance, Ferry *Mary Anne* is believed to be the oldest ferry boat in the UK and possibly the earliest surviving public service working boat. As the only surviving example of the large rowed Windermere ferry boats designed to carry people, carriages, goods and animals across the lake, she represents a service that goes back to at least the 1450s.

Sandbarge *Elizabeth*, c.1830, was used for carrying copper ore on Coniston, where the shaped loading berth is still in evidence. Research into the date of the partial vessel is ongoing and may prove her to be not only an extremely rare survivor of industrial working and one of the oldest surviving small cargo vessels in the UK.

3.5 Technical Significance

From a medieval logboat to twentieth century hydroplane, the collection unfolds a fascinating tale of technical innovation. The collection includes outstanding examples of cutting-edge technological innovation in boat design and build from the fourteenth to the twentieth centuries. Construction types represented in the collection include dugout, clinker, carvel, double diagonal, hot and cold moulded, plywood, steel welded and wrought iron riveted hulls. Visitors and researchers will be able to appreciate the advance of wooden boatbuilding, from the Kentmere logboat, built up to achieve greater freeboard, to the streamlined construction of Miss *Windermere IV.* Developments in fast steam launches and record breaking hydroplanes show how centuries-old skills and an understanding of hydro and aerodynamic movement were employed in a rapidly developing new context.

Astonishing skill is evident in the manipulation of a range of materials, whether it is the extreme curve of *Margaret's* planks where they fit into her stern, or the precision fitting of 50 foot long teak planks into the complex canoe stern of a wooden launch. There are excellent opportunities to compare and interpret different design and construction methods for working boats and for leisure vessels – from simple 'carpenter-built' tarn boat to bespoke luxury launches. Whilst working boats such as the ferry were probably built 'by eye', the canoe and counter sterns on the more refined vessels were only achieved through tailored design, experience and an elevated level of craftsmanship.

The collection illustrates advances in hull design for performance and speed, from the eighteenth-century yachts to experiments with stepped and hard chine hulls and the influence of aircraft design on waterborne craft. This was combined with rapid advances in propulsion. Vessels within the collection illustrate the level of innovation required to achieve speed records on a world stage. The lake launches often directly reflected their owners' obsessions with technological innovation – a passion for steam, gas or electricity that could be indulged on land and on water. Reading the vessels within the context of the architectural history of the lake

houses brings a unique insight which is not equalled in any other collection. The boats from 1890 to 1914 were built at a time when wealthy people were pioneering the use of motor cars, whether powered by steam, electricity or the internal combustion engine.

Many vessels have close links with internationally famous designers based around the lake – the creative, the inspired, the rich, the eccentric; a number demonstrate distinct technical or design innovations associated with these people. Prolific designers, Alfred Sladen and Percy Crossley, had the leisure and wealth to see their cutting edge designs implemented and refined.

Jack Kitchen was the local inventor behind the internationally significant 'Kitchen reversing rudder' and Lune Valley Boiler, as well as wildly eccentric inventions ranging from the elliptical wheel to steam powered bicycles and self-heating cans. The Museum collection includes a Kitchen reversing rudder, of the type used (unsuccessfully) on MV *Canfly*, and important examples of his Lune Valley boiler. SL *Bat* is famous as it was used for groundbreaking remote control experiments on Windermere in 1904 by Kitchen and fellow inventor, Isaac Storey.

Other vessels are the only surviving examples of a particular technical development. For example, *White Lady II* is the only surviving example of a pivotal design stage in the work of internationally influential powerboat designer, Hubert Scott-Paine and his chief designer, Fred Cooper. Her advanced hull design, innovative rudder and steering systems and assimilation of aeronautical design place her at the forefront of technical development.

Engineering is a strength of the collection, bringing a fast-moving tale of innovation that runs from *Dolly's* early engine and boiler to boats that have been powered by Jaguar, Chrysler and Rolls Royce engines. *Dolly's* engine and boiler are of exceptional interest to the study of early steam technology, demonstrating early safety valve operation and boiler construction as well as Stephenson's linked valve gear. The Trust's collection of Sisson of Gloucester steam engines is unparalleled and shows how technical innovation supported wealthy lifestyles and transformed the use of steam power on Windermere. The move to internal combustion is well represented in both its transitional and fully developed stages. For example, the 1898 motorboat is one of the oldest petrol powered boats in the world, *Water Viper's* experimental 1934 marine diesel engine is very rare, whilst *Canfly* dominated the lake when she raced across it fitted with a 1917 Rolls Royce Hawk aero engine.

3.6 Community Value

Whilst it is of national and international significance, the collection has deep local roots. It was largely brought together by George Pattinson, a local builder whose family has been part of the Windermere community since the sixteenth century. Pattinson responded to strong public interest in his collection by setting up the Windermere Nautical Trust in 1971 and opening the Windermere Steamboat Museum in 1977. Subsequent acquisitions strengthened the collection resulting in the significant and varied group of vessels all associated with Windermere.

The boats in the collection were built or used on Windermere and stories of local people, local places and local traditions bring them to life. Through consultation and discussion with many local people it is evident that the collection is integral to the heritage of Windermere and there is a strong sense of ownership and pride in the collection. Comments received through consultation include:

> 'The museum has a unique collection of boats which should be displayed in their home setting which should also depict the character of the area. The whole story of these boats is important if the general public is to appreciate them.'

'I have an interest in the boats of Windermere as my father grew up in Bowness and it was where he decided to become a marine engineer after messing about on the boats from the old yards.'

Engagement with local people and communities has been developed through the Activity Plan and detail about specific projects can be found in the Action Plan.

3.7 Literature, Films & Paintings

There is an internationally significant body of art and literature associated with the lake environment and the Lake District. The Windermere Steamboat Museum collection relates to the growing appreciation of the picturesque and sublime in the eighteenth and nineteenth centuries, the Romantic tradition and the Arts and Crafts movement.

Individual boats are also celebrated and remembered in literature, art and film. There is a particularly evocative body of art and literature related to the Windermere ferry service, including a charming illustrated letter from Beatrix Potter. The de Loutherbourg paintings at Abbot Hall depict the notorious 1635 'mournful marriage', when around 49 wedding guests were drowned on a ferry trip.

Most famously, TSSY *Esperance* was immortalised in Arthur Ransome's *Swallows and Amazons* series of books as Captain Flint's houseboat. As a result, she is very special to followers of Ransome's writing and of internationally-debated literary and artistic importance. There is a wealth of significant Ransome material at the Museum of Lakeland Life and Industry, including his original sketches for the houseboat drawings. The new Museum will provide an excellent opportunity to feature these near the lakes that inspired him, and for visitors to engage more closely with his creative process.

The Trust is well placed to develop these links in the new Museum. In the wider collections of the Lakeland Arts Trust, for example, sketches by enthusiastic amateurs sit alongside works from internationally renowned artists such as JMW Turner, John Ruskin and Edward Lear to create a vivid sense of early Lake District travel and tourism. Strong literary links, from Thomas West to William Wordsworth, also support this theme. WG Collingwood famously celebrated the lake in both literature and art but the whimsical steamboat sketch that he made for his son has been very rarely shown. Beatrix Potter's celebrated passion for the lakes began on Windermere with family holidays at Wray Castle; the rowing boat that she used once she became a more permanent resident is a much loved feature of the collection.

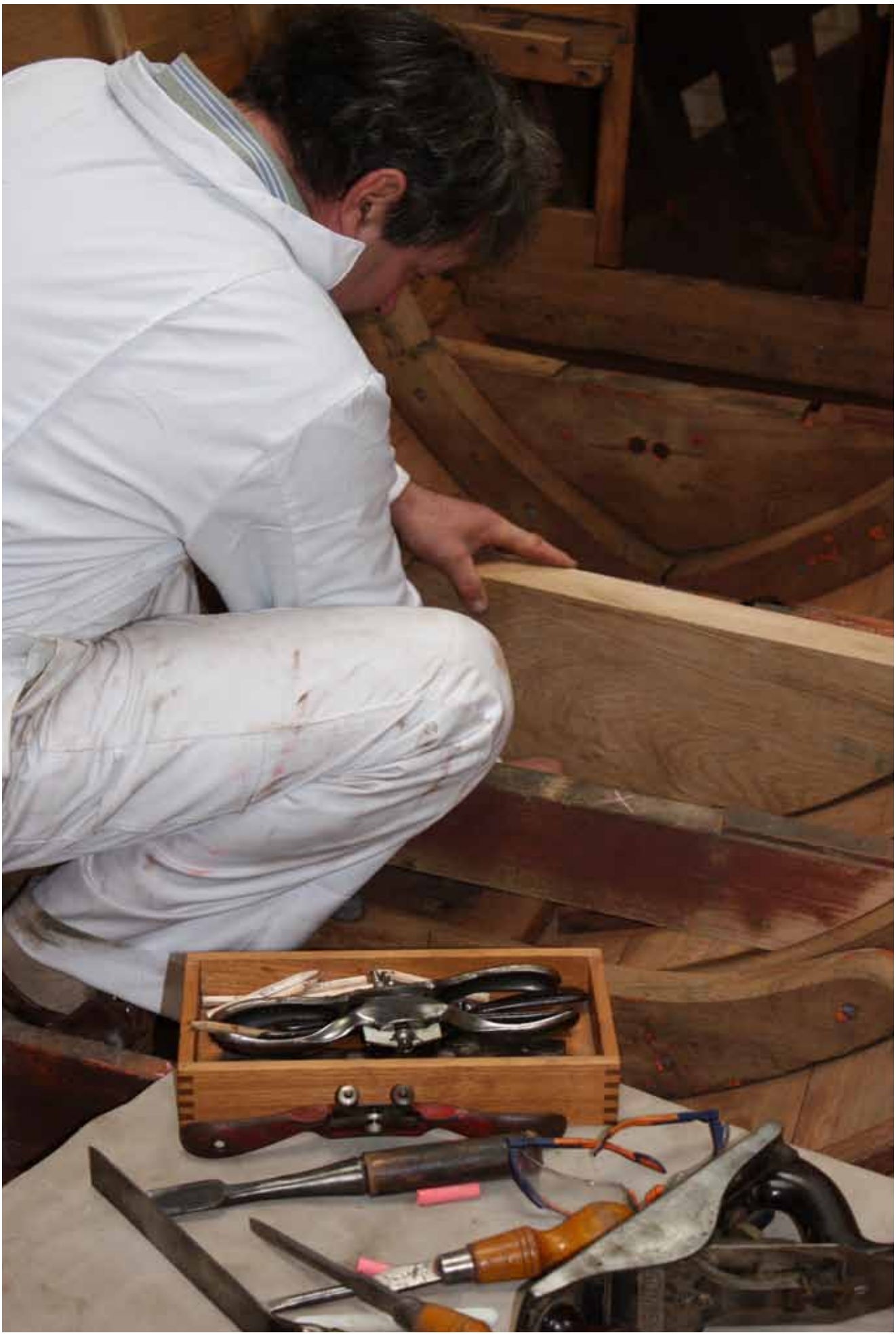
3.8 Learning & Enjoyment

The collection provides opportunities for people to explore a wide variety of subjects through formal and informal learning and in new and exciting ways. The Activity Plan sets out our plans to use the collection for leaning and enjoyment. We want to create a programme of activity that is unique to the Museum, which provides opportunities to support the teaching of subjects not usually identified through heritage collections, museums and galleries. Through consultation and conversations with schools, we have identified a wealth of opportunities to engage with science, technology, maths (STEM) and history. As there is a lack of this provision nearby, the Museum is ideally placed to offer a formal learning programme that inspires pupils and supports the increasingly important STEM subjects.

3.9 Conservation & Use

The collection and the story of how it came together and continues to be managed contributes to our understanding of the conservation of heritage. Its past and present care provides a wide-ranging insight into the complexities of maritime conservation. The story of the boats' conservation and use begins with the story of the people who built, used and maintained them and continues through their more recent history, in Pattinson's private ownership and as part of the Windermere Steamboat Museum collection. Records relating to the historic approach to routine maintenance, including boatbuilders' account books, oral history recordings, early logbooks and letters from launch owners to operators reveal an insight into the conservation of these vessels providing a rich resource to inform the ongoing conservation.

A number of vessels were salvaged from the lake bed and the story of their survival is interesting, not only for the practical detail and the insight into how they were saved, but also in terms of changes in conservation practice and developments in technical investigation.



Conservation work at Windermere Steamboat Museum © Lakeland Arts Trust

4 Risks & Opportunities

4.1 What is Happening to the Heritage

The project to redevelop the Windermere Steamboat Museum involves construction of new facilities on the current site of the Museum as the existing buildings are dilapidated and not fit for purpose. The condition of the buildings puts the collection at high risk of damage from water ingress, failed structure, including roof collapse, and unsuitable environment. The collection is currently stored in the old Museum buildings and a secondary temporary storage facility on the same site. The construction works will involve demolition of all the old Museum buildings and construction of new, museum-quality facilities, including a new conservation workshop, exhibition gallery and wet dock.

During the delivery phase of the project the collection that is in store in the Museum will be moved and placed into temporary storage, some of which will remain on site and the remainder will be stored elsewhere. Two boats within the collection are currently on the water at the site and these will remain.

The construction of the new Museum is programmed for a 14-month period during 2014 and 2015. On completion many of the vessels and associated objects in the collection will be reinstated to the Museum. During delivery the collection will be conserved as demonstrated in the Action Plan which will take place in temporary facilities on the site during construction in addition to some works that will be completed by external contractors. Once complete, the new conservation workshop will be used for conservation and maintenance of the collection.

4.2 Key Risks

The project to improve the facilities for the care of the collection will potentially expose the vessels to a number of risks both during and after the project is complete.

Condition of the collection
The most significant risk related to the project is the condition of the collection. The Lakeland Arts Trust took over the Museum and collection in 2007 at which point the collection was deemed at risk and was in poor condition. Since this time the Trust has taken measures to manage this risk including moving the collection to the temporary storage facility in which it is currently situated, commissioning cradles for the boats and improving the documentation, all with the support of the NHMF grant. Initial conservation work has been undertaken to secure the collection and the restoration of SL *Osprey* is currently in progress.

The boats are supported by moveable cradles designed to meet the specific requirements of each vessel. Basic control of the environment is carried out in the store, but this does not create the optimum environmental requirements for the collection and therefore prolongation in this environment is potentially a risk to the condition and stability of the vessels. The risk may be increased during construction of the new Museum as much of the collection will remain on site albeit separated from site works.

Resources
Having and maintaining the resources to manage and conserve the large collection poses a risk to its long-

term security. The heritage skills required to conserve and protect the boats is a diminishing resource, which could impact the Trust's ability to, and the cost required to look after the collection.

Access
The project will increase access to the collection both physically and intellectually. The boats on display in the exhibition gallery and in the wet dock will enable people to appreciate and enhance their understanding of the heritage. However, with increased access also comes the risk of damage to objects through handlings or increasing risks such as fire and theft. The Trust wants to improve physical access to some of the boats for people with disabilities and this risks potential damage or removal of historic fabric.

Public expectation
The business plan that has been developed for the Museum is based on 100,000 visitors each year. Through consultation during the development stage of the project it is evident that a large proportion of visitors will expect to be able to take a trip on a boat as part of their visit to the museum. The historic and fragile nature of the collection means that vessels to be used for public access and excursions on the Lake will need to be chosen with great care – only those which are robust enough, those which do not require intrusive adaptation to their original fabric, or those which have undergone significant adaption/ reconstruction in the past will be considered. The capacity of the historic vessels that will be operating means that the Museum will not be able to offer a historic boat trip to every visitor and therefore managing public expectation will be a risk to the visitor experience.

4.3 Opportunities

Whilst there are a number of risks, the project also presents numerous opportunities for improving the heritage.

Long-term conservation
The core aim of the project is to conserve the collection for future generations by creating museum-quality facilities and through the conservation programme. The latter will stabilise the collection and commence a programme for conservation over a 15 year period. The facilities and programme will create an opportunity for people to directly see and experience the conservation work taking place, improving people's understanding of the collection and heritage conservation.

Developing heritage skills
The Activity Plan maximises opportunities for developing heritage skills through the conservation programme. For example, a workshop apprentice, the volunteer training programme and the 'Master Craft' activity proposed as part of the community engagement activity will all contribute to developing heritage skills.

Improving understanding of heritage
The project will allow for positive opportunities to interact with the collection. For example 'Full Steam Ahead', is a formal learning activity that will involve engineers starting up the engine and demonstrating the technological principles involved in steam. The boat trips will provide the opportunity for visitors to experience, first-hand, what the vessels were originally designed for on Windermere.

Sustainable future
The proposals for the Museum have been developed to ensure the Museum and the conservation of the collection is sustainable in the long-term. Maximising opportunities to raise the revenue needed to meet the needs of maintaining, managing and conserving the collection.

4.4 Conflicts

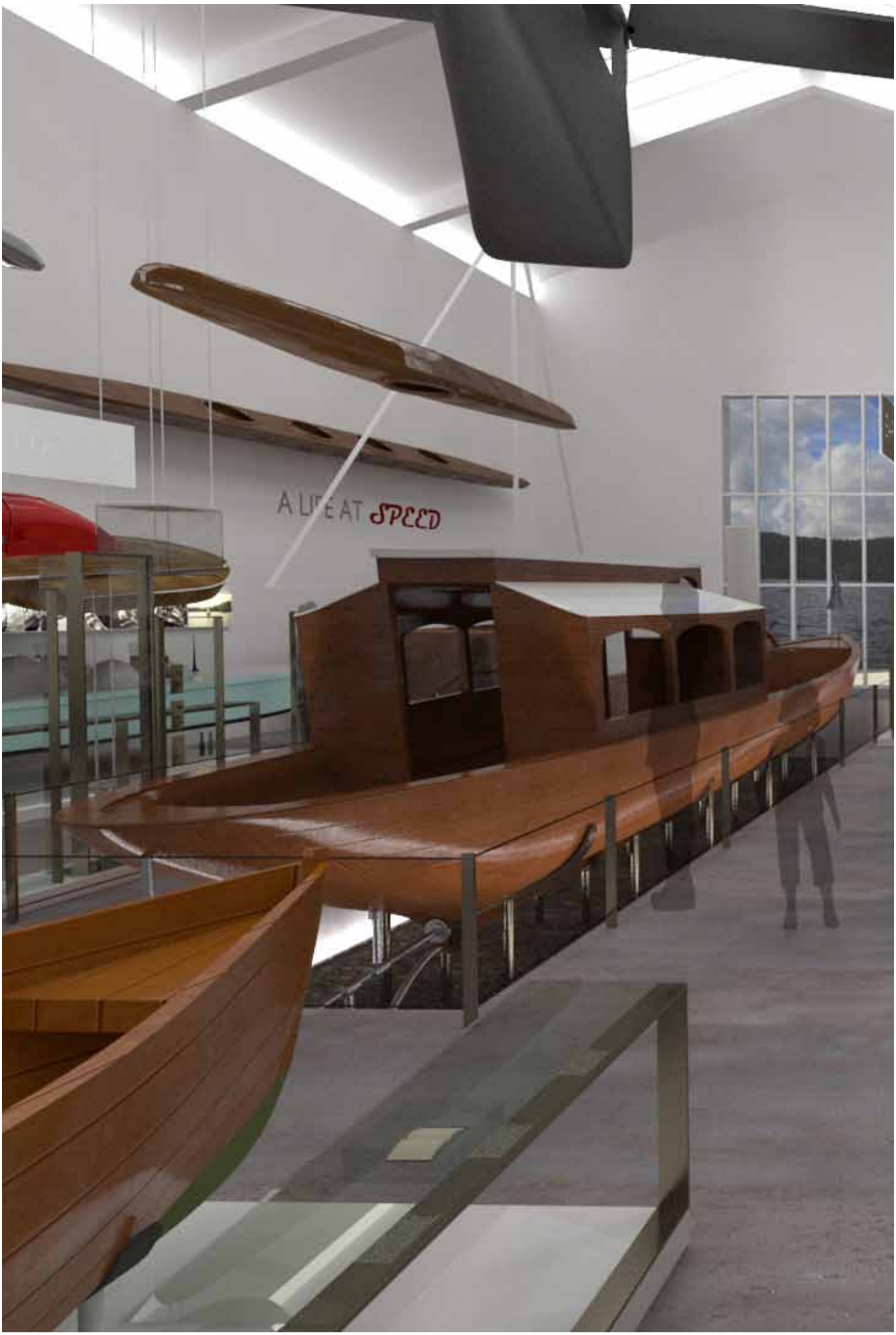
Access to the collection
The opportunity to allow a wide range of audiences to access and engage with the collection inevitably also presents risks to the heritage. The risks are presented, for example, through the operation of the vessels for passenger trips, potential damage through 'touch', and maintaining a suitable environment and exposure to light levels. All of these risks will be managed through the implementation of this Conservation Management Plan and in the design of the new museum, balancing the benefits and risks to the condition of the collection in order to enable public access.

Visitor Capacity
The detailed business plan estimates that the Museum will receive 100,000 visits per year, and models 70k, 80k and 120k scenarios as well. Participation and learning focused around the collection is fundamental to the operation of the museum, however this must be balanced with the management of the collection and the impact of visitors on the condition of the collection. The Museum will manage group sizes and visitor flow to ensure the collection in not compromised. Whilst the collection should be accessible to as many people as possible; too many visitors can create conservation risks through wear and tear and affect environmental conditions.

Activities and Events:
The Museum will be used for a wide variety of events and activities as part of the proposals for formal learning, informal learning, community engagement and volunteer and training. These are set out in detail in the Activity Plan, but will include, for example: lectures and talks, engineer-led demonstrations, outreach events, school workshops, national events and volunteer training. Museum spaces will be hired out for events run or managed in association with the Museum. These activities and events bring new audiences into the Museum and are an important source of income generation. The Museum will manage activities and events in order to minimise risks to the collection. The main events spaces are designed so that they can be used separately from the collection areas.

4.5 Other risks to the collection

In addition to the key risks identified above, the conservation team have compiled a risk table identifying risks to the collection and assessing them in order of high, medium and low risk. This table can be found in Appendix 3.



Proposed exhibition space © Real Studios

5 Aims & Objectives

This section details our aims for the project and how the Trust will approach the conservation of the collection. We have adapted the structure of this section because of the complexity of the collection. A summary of how the conservation approach has been informed by the National Historic Ships (NHS) guidance on conserving historic vessels is followed by a series of method statements demonstrating how the Trust will approach the conservation of the whole collection.

As the collection comprises over 40 individual vessels each with nuanced conservation requirements, as well as various small objects in the supporting collection, the series of six method statements will be used and applied to each boat to determine its conservation programme and the subsequent maintenance implications.

The aims for the Museum's facilities and site are demonstrated within the design report produced at RIBA Stage D in March 2013; this document also outlines the maintenance requirements of the buildings that will house the collection as well as access to the site and collection and the environmental control and sustainability measures that are to be employed.

5.1 Aims for the Project

The overall aim of the project is:

To conserve and display the internationally important boat collection on Windermere in the heart of the Lake District, and create a dynamic and sustainable museum which conserves and interprets the boats in an active and engaging way, involves people in heritage and stimulates economic development.

In order to achieve this we have identified the following aims. These have been reviewed and revised during the development phase, the learning and participation aims are met through the Activity Plan and we have responded to the sustainability aims through the business plan and design development.

Learning

1. Create opportunities to develop excellence in heritage conservation and restoration skills.
2. Create inspiring interpretation to enrich people's understanding of their heritage.
3. Provide innovative opportunities to help people engage with heritage, and learn about the collection, Windermere and industrial and social history.

Participation

4. Offer new and exciting opportunities for people to volunteer.
5. Involve communities and actively engage them with the museum and its collection.
6. Attract diverse audiences and broaden participation through the Museums activities.

Conservation

7. Conserve and secure the long-term future of the unique and internationally significant collection of boats.
8. Work in partnership to develop excellence in conservation and care of historic vessels and related collections.
9. Share knowledge and experience with people caring for other maritime collections.

Sustainability

10. Enable the museum to be sustainable in the long-term through quality of visitor experience and by delivering the business plan.
11. Create an environmentally sustainable museum and minimise our carbon footprint.
12. Support the economic and cultural development of Lake District, Cumbria and the North West.

5.1.1 Aims for conservation

The aims for conservation will be met through the conservation management plan and the resulting conservation programme. The methodology for conservation detailed later in this plan will ensure the long-term future of the collection is secured and that excellence in heritage conservation is achieved.

5.2 Approach to Conservation

The conservation planning for the collection at the Windermere Steamboat Museum is complex as a result of the significance of the collection, the range of conservation requirements across the whole collection, the recent history of operational use of many of the vessels, and the fact that we wish to continue operating selected vessels. Following our HLF First Round conservation statement, we have carried out further investigations, held a series of workshops and sought additional advice on the best conservation route for the collection.

To support our thinking and provide a consistent and structured framework for decisions, we have used the 10 conservation principles and 9 stages of work set out in *Conserving Historic Vessels*, National Historic Ships (2010). This publication, combined with regular updates provided on the NHS website, is considered to be the first source of guidance for care of historically significant ships. It was produced by National Historic Ships to assist vessel custodians in caring for maritime heritage and reflects the thinking of the foremost people in the field of historic vessel conservation.

The 10 conservation principles as presented in *Conserving Historic Vessels* are:

1. Historic ships and boats should be conserved according to their significance.
2. The aim of conservation is to retain the significance that has been identified and pass it on to future generations.
3. All aspects of significance should be dealt with in a considered and thoughtful way.
4. Rigorous maintenance is a key to good conservation practice for all vessels.
5. Make and keep records throughout, including recording all changes to the vessel and what happened to any material which has been removed.
6. When in doubt, do the minimum. Conservation demands a cautious approach to change.
7. Replace like with like wherever possible and practicable.
8. Conjecture should be avoided in all conservation projects. If uncertain, don't do it.
9. The best knowledge, skills, techniques and types of management available and affordable should be employed in all types of conservation.
10. Do things in a logical order as set out in this book.

5.3 Conservation statement

The conservation route for each boat in the collection has been assessed individually. Using the conservation gateway guidance set out by National Historic Ships, we have used the information available to make an initial decision at the first 'conservation gateway'. This includes whether a particular boat should be conserved with minimal intervention in order to preserve the fabric or whether a degree of operational use is desirable and feasible. The activity, interpretation and business plans include use of some vessels for operational use carrying passengers and we know a boat trip is something that visitors would like to experience and was a key feature of the old Museum For example, the Trust identified SL *Osprey* as suitable for regular operational use, but the more delicate and historic SL *Branksome* has been identified for conservation and display in the exhibition gallery. The payback potential from operating the vessels is mainly in improving the visitor experience and supporting learning and outreach activities; the business plan identifies net-nil return taking into account the cost of operation and maintenance. Operation will put boats at risk of damage and the Museum will address this through careful management and strict procedures.

Before proceeding further, we carry out further work to assess the risks associated with our preferred route, leading us in most cases to a decision at the second 'gateway' on the conservation process. However, this has also been an essential process for checking that we can still justify our initial decision and in some cases further risk assessment led us to revise the earlier decision.

Decisions on the conservation route have taken the following into account:

- Vessel significance
- Extent of and nature of remaining original material
- Previous conservation treatments and current condition
- Level of intervention/extent to which original material would be compromised by the chosen conservation route
- Suitability for wet or dry display, taking into account the following:
    - Best means of preserving the vessel's fabric
    - Best environmental conditions for the vessel
    - Best means of enabling people to appreciate the vessel
    - Impact of maintenance required
    - Intervention required to maintain vessel on wet display
    - Potential risk to vessel from wet display (and level of intervention required to overcome it)
- Payback potential in terms of visitor experience and supporting business plan of the vessel relating to the level of intervention required
- Outreach and engagement potential afforded to a particular conservation route
- Visitor expectation

If wet is found to be most suitable from a conservation viewpoint, suitability for operational, or static display is assessed, taking into account the following:

- Degree of strengthening, intervention or adaptation required for operational use
- Potential strain on vessel of operational use
- Specific risks posed to the vessel by operational use

- Specific benefits to vessel of operational use (e.g. to engine and moving parts)
- Impact on original vessel fabric of level of maintenance required
- Impact of operational use on associated original fixtures and fittings
- Impact on vessel fabric/structure of substantial numbers of people accessing it over a prolonged period

In considering which vessels are suitable for operation, we work within the general framework outlined above and use recommendations from National Historic Ships and specialist advice. In addition, we apply the guidelines for care of large working objects , giving particular consideration to the balance between the (in this case conflicting) benefits of enabling understanding of form and function and of preserving original fabric (MGC section 4.7).

Information on our process for decisions relating to engines is included in our method statement later in this section but *Canfly* is a useful example here. Some of her significance lies in the engine's operational status, but we are concerned about operational risk unless the engine is completely dismantled and rebuilt. An external inspection, review of previous history and report by Richard Wardle, Manager Company Spitfire, Rolls Royce plc led to the Trust's decision that in this case preservation is more appropriate than operation. The report highlights:

- That preserving the engine as a static exhibit keeps it in most original condition
- Occasional operation would attract publicity and interest but would require a number of elements, such as ignition and cooling systems, to be fully overhauled, there are risks if the engine is not stripped down before operation, and there is a risk of operational failure
- Full operation would require the engine to be stripped down and rebuilt by a specialist with consequent loss of originality.

There would also be:

- Risk to the boat through operation
- Risk to driver and spectators as a result of limited speed controls
- The balance of maintenance for wet rather than dry display
- The benefit, in terms of understanding, seeing *Canfly* in operation, as balanced against other methods of appreciating her operational performance

In this case, we have decided that the operational route carries too much risk, so have selected preservation for engine and vessel.

If dry display or storage is most suitable from a conservation viewpoint, decisions on level of use are taken according to:

- Whether or not understanding of the vessel will be enhanced by demonstrating an aspect of the vessel (e.g. engine)
- Whether access is possible and, if so, whether the level of intervention in historic material required can be justified
- If access is possible, the impact on vessel fabric/structure of substantial numbers of people accessing it over a prolonged period
- Maintenance requirements if the vessel is accessed.

For all vessels intended for dry display, consideration is given to:

- Preferred environmental conditions to preserve the boat in the best way, including cased or uncased
- Best means of support out of the water, balanced against enabling visitors to see vessel as a whole
- Ease with which vessel can be moved
- Best angle for display, taking into consideration physical support, flexibility, visitor viewing angles, and meaningful display for understanding of vessel.

Branksome will be the centrepiece of the dry display. Further detail of our thought process and method is given in method statement and case study two. Assessment of her originality, the fragility of her surviving furnishings, her construction, and the level of intervention required in order to operate her, led us to selecting the 'preservation' route. Also significant in this group are the hydroplanes and some motorboats. It is not practical for us to demonstrate most of them because of speed limits. In some cases operation could result in risk to significant engines. Showing these boats in a dry display enables us to protect vulnerable elements, feature the all-important hull designs, and leave potential in the future for occasional carefully-managed static demonstration of the most significant features. Display enables visitors to get close to the boats for example, to see the ingenious mechanism that operates Uncle Sam's disappearing propeller.

We consider the conservation requirements of other collection material on a case by case basis. The collection, includes:

- Books and works on paper, including prints, drawings and photographs
- Paintings
- Ephemera
- Archival material
- Silver and crockery from boat interiors
- Boat models and half models
- Fixtures and fittings, most but not all of which will be returned to boats including lights, whistles, wheels and steam kettles
- Original and replacement fabrics and upholstery from boat interiors
- Engines and boilers and engineering parts
- Sails, rigging and pennants

We select the most appropriate conservation /storage /display option for these supporting objects according to:

- Significance
- Current condition and previous conservation treatments
- Stability/urgency of requirement for conservation treatment
- General environmental control requirements
- Need for rotation on display (for example light sensitive fabrics and works on paper)
- Benefits and disadvantages of re-instatement on vessels
- Ability to support understanding of a particular vessel or interpretation theme
- Ability to support understanding of the conservation process.

We outline the conservation methodologies below. The assessment of the appropriate route for each vessel has been informed by the nine stages of activity given by National Historic Ships. These are:

1. Early vessel evaluation and acquisition
2. Stabilisation
3. Understanding
4. Assessing significance
5. The conservation gateway
6. Identifying risk to significance and evaluating viability
7. Beyond the gateway: conservation processes
8. Replication
9. Maintenance

More detail on each of these stages can be found in *Conserving Historic Vessels*.

5. 4 General Conservation Method Statement

5.4.1 Introduction

The Lakeland Arts Trust has developed the Conservation Method Statement (CMS) following advice from Ian Clark, and is informed by his work. The Trust's Conservation Workshop Manager and Curator have prepared the associated individual method statements and case studies at the end of this section. These provide representative examples of approaches to the different routes for conservation of the collection, as follows:

Method Statement	Case Study
1. Stabilisation	SL *Dolly* 1850
2. Preservation: Dry display	SL *Branksome* 1896
3. Restoration: Static	SL *Lady Elizabeth* 1895
4. Restoration for Operation	SL *Osprey* 1902
5. Stabilisation for Adaptive Re-use	SL *Raven* 1871
6. Phased Deconstruction	Ferry *Mary Anne* pre-1870

The CMS will adopt the guidance and definitions as promulgated by National Historic Ships in *Conserving Historic Vessels* (NHS, 2010). The CMS will be applied to both the initial conservation programme of work as part of the HLF funded project and the ongoing conservation of the collection in the future. The relevant method statement, no.1 – 6, will be applied to each boat in the collection to plan the most appropriate conservation route. For many of the boats within the collection this will initially involve stabilisation and will be followed by the application of a different method statement, for example, in year 1 *Raven* will be stabilised and later may undergo adaptive reuse.

The collection has a complex history of use and ownership and has been subject to different preservation strategies. While we will advocate conserving vessels to a form that is consistent with their originality we will also take into account the impact of other conservation approaches and past changes such as the removal of Water Viper's original steam engine and replacement with a combustion engine.

5.4.2 Allocation of resources

The Museum has a large collection which brings diversity and significance but also some inherent challenges. As well as preparing vessels for wet and dry display and for accessible storage, we have a responsibility towards the whole collection. Stabilisation (see method statement 1) will therefore be a priority,

to ensure the long-term survival of all boats and project sustainability.

Funding will be apportioned pragmatically in order to spend money in line with priorities to stabilise, consolidate and enhance each element in proportion to its needs and status within the project. The boat conservation programme will demonstrate conservation best practice while remaining pragmatic and deliverable.

HLF funding has therefore been divided across the collection, as follows:

- Preparation of 16 vessels for dry display
- Preparation of 4 vessels for wet display
- Stabilisation of approximately 25 vessels for the conservation gallery, off-site storage or outdoor display
- Allowance for 400 hours' work on small objects and engineering parts
- Preparation of engines and boilers for display, including interactive engineering elements.

This will be supplemented by completing the restoration of SL *Osprey* as an operational vessel which the Trust is funding outside the HLF project. In addition there will be an annual conservation budget post opening and the Museum will raise funds for specific projects.

In order to prepare effectively for opening and to stabilise boats within a reasonable timescale, we will use a combination of in-house staff, trained volunteers and external specialist contractors. We will select external contractors through tenders with clear briefs, and ensure they are accredited conservation/restoration companies, or boatbuilders with substantial and proven experience in historic vessel conservation projects. For consistency, work will be carried out to written methodologies and under the overall supervision of the Lakeland Arts Trust. The general guidelines in this method statement (below) provide the basic framework.

5.4.3 Access

Our priority is to stabilise and consolidate the collection prior to opening. This will be subject to the constraints of time, budget and access (i.e. not being able to dismantle some items completely in the current inadequate facilities). During stabilisation, we will identify further work and build it into future plans. For example, engines treated in situ will be completely inhibited with preservative treatment and those selected for workshop conservation will be conserved according to the correct methodology.

5.4.4 General guidelines

The Trust will apply the following general guidelines to all work on the collection:

Cleaning methods

- All work will be 'low intervention'
- All conservation cleaning processes will be sensitively hand applied
- We will not use mechanical or air abrasive cleaning except where best practice/ technical performance dictates this, for example heavy sanding and sand blasting.

Surface treatments

- Where applicable all original surface finishes and coatings will be retained and conserved
- Existing patinas and wear patterns will be conserved to retain originality
- No paint or additional surface coatings will be applied unless a specific area could be greatly enhanced by this action
- All conservation cleaning materials will be sector approved/tested
- All protective coatings and cosmetic treatments will be wax/oil based and applied by hand

- The use of lacquers or varnishes for surface protection will only be considered for targeted 'high risk' objects/selected areas
- All original and existing metal work where applicable/accessible will be cleaned and presented in a workmanlike manner consistent with operational vessel standards.

5.4.5 Surface finish

The Trust will decide the level of surface finishing according to the criteria below:

- Material
- Accessibility
- Retention of original or period finishes
- Retention of surface damage derived from working or operational maintenance procedures
- Retention of original operational information on components in the form of written/painted or hand chased script
- Display and interpretation requirements
- Health and Safety requirements
- Expectations for levels of conservation or aesthetic appeal

The Museum values the patina of age on vessels and their fittings, and any evidence of their former use, and we will aim to preserve and interpret that where possible. This may mean that metalwork on preserved vessels is not maintained daily to a shipshape shine, but is polished to a lesser level using low-abrasion cleaning techniques and a build-up of protective waxes. As well as reducing the risk of gradual erosion of soft metals, this also reduces the risk of damage to surrounding parts through inappropriate cleaning or increased access for surface maintenance.

Traditional oil based varnish, chosen for UV resistant properties and hard wear will be preferred. Traditional oil based varnish, chosen for UV resistant properties and hard wear will be preferred. The specification for all new varnish work, when applicable within the method statement, is a good high level full gloss traditional finish applied by brush. If brush marks appear, we are content that this reflects the historic appearance of surfaces when the launches were first in operation.
The Museum will only polish brightwork – connecting rods, crankshafts, valve gear - to a high standard where required for operational reasons.

5.4.6 Repairs and replacements

The Museum's procedure for repairs and replacements is to only consider mechanical repairs, component replication or refitting work in the following circumstances and after assessment of impact on significance:

1. For health and safety requirement or compliance
2. To aid interpretation or enhance educational requirements
3. To 'restore' a component's integral strength
4. To 'restore' or enhance architectural or structural integrity
5. As part of an operating strategy

Any repairs or replicated components must observe original or accepted design features and proportions. Wherever possible the Museum will use traditional materials and construction techniques/methods.'

5.4.7 Risk

The extent of work may be difficult to define for some aspects of the conservation programme. The Museum will assess risk according to the following criteria when defining the level of difficulty in delivering best practice and best value practical conservation within the programme:

Access

- Level of unidentified risk
- Accessibility
- Degree of difficulty in quantifying the object/area
- Current or potential access criteria
- Prioritisation afforded of any given area/space

Structure and nature of materials

- Complexity of design or build
- Type of material
- Method of construction
- Compound risk of composite materials
- Sensitivity of area or object
- Level of evident corrosion or surface degradation
- Level of perceived/residual corrosion or surface degradation
- Volume of material in one given space/area
- Scope of material in one given space/area

Health and safety

- How conservation treatments will impact on interpretation/public
- Presence of identified toxic or hazardous material(s)
- Risk potential of unidentified toxic or hazardous material(s)
- Nature and level of residual risk post operational service
- Current or potential Health & Safety considerations

Project context

- Potential level of apportioned/committed project funding
- Level/risk of conservation programme sustainability
- Level/percentage of risk calculated to deliver the conservation project
- Level of success in delivering the conservation programme on time/on budget
- Level/percentage of risk mitigated within the CMS terms of reference
- Impact of peripheral activities on the conservation programme'.

5.4.8 Risk and hazardous substances

The collection includes substances hazardous to health, including asbestos, as an integral part of historic assemblies. The Trust has surveyed for asbestos within the limits of access. All work will be subject to visual survey and risk assessment. Decisions over removal or encapsulation of asbestos components will be made on a case-by-case basis, according to legislation and with personal safety and historic integrity

in mind. Conservation workshop and operational procedures will be subject to the Trust' health and safety policy, with risk assessments and COSHH assessments in place and communicated to all staff, contractors and volunteers.

5.4.9 Environment

Relative humidity and air temperature

The environmental strategy for the new museum facilities is outlined in the Stage D report. In summary, the temperature and relative humidity (RH) in the main exhibition space and conservation gallery will be controlled primarily through passive building design, with a particular emphasis on reduction of RH fluctuations. The strategy identifies a need at certain times of year for some additional humidification within these spaces. Because the visit is a 'coats on' experience, the drying impact of visitor comfort heating will be minimised.

The Trust has specified the relative humidity and air temperature parameters for the exhibition gallery to meet the collective conservation requirements of the collection. The RH target range of 40-65% and air temperature of 16-20°C in the exhibition gallery will be suited to the organic elements of the collection but we are aware that different woods, and different cuts and volumes of wood, react differently and at different speeds. Organic materials found within the displayed collection include larch, oak, elm, teak, pine, mahogany, American black walnut, iroko, silk, linen, cotton, canvas, paper and leather.

Because the RH levels are aimed at the needs of organic collections, we have identified mitigating actions to ensure that protection is achieved for ferrous metals in particular. This will take the form of conservation-sector approved waxes or oils to reduce corrosion risk. In applying surface protection, we will consider, on a case-by-case basis, visual impact and the closeness of visitor access as well as conservation requirements.

An accepted design RH prerequisite may in some cases be driven by a specific metallurgical or scientific requirement influenced by the nature and severity of the environment within which the object was found or subsequently stored coupled with the base elements of construction and their interplay. To this end all display objects where the constituent materials are ferrous based, need to be individually assessed and their environmental display parameters calculated accordingly. Another consideration always has to be the physical size and delicacy of construction of the display object together with the metallurgical ability to resist environmental compromises.'

When appropriate, vulnerable elements will be stored separately in an environment (showcase or store) suitable for their needs.

Interaction between 'incompatible' elements such as iron and oak is unavoidable in the context of the collection but will be assessed and monitored on an individual vessel basis. Vessels in the wet dock or under cover outside will not be in a controlled environment, but will be protected from extremes of rain and sun.

5.4.10 Light

The project design team is using light mapping and projection of lux levels to inform the design of the Museum to avoid the damaging effect of uncontrolled light levels on organic materials, and in particular of the heating effect of direct sunlight on both wood and metal. This includes incorporating additional protection where necessary. Films or coatings will be used to exclude UV and exterior roof overhangs will exclude much direct sunlight. Light can be excluded completely in storage areas and some very light sensitive items will be removed or replaced with replicas.

Showcases will be located in areas where light levels are more easily controlled and artificial lighting will be dimmable and low UV. To control light levels outside visitor hours, particularly in the summer, local protection

(covers) will create blackout conditions for the most sensitive objects.

The Museum will monitor light levels and map individual light exposure, to ensure that single objects or components do not receive an unacceptable 'light-dose' over the course of their display life. Light-vulnerable materials preserved on display and in store include all woods and veneers, textiles, painted and varnished surfaces, paintings, works on paper, some synthetic materials and rubber.

Protective coatings on wood and metal may deteriorate more quickly if exposed to higher light levels. While the coatings on the boats were originally designed to withstand outdoor conditions, by reducing light levels for preservation purposes, we are reducing not only direct damage and risk of distortion due to localised heating from direct sunlight, but also the need for renewal of surface protection, which could lead over time to the gradual erosion of original material. Surface finishes on operational vessels will be selected for their UV resistant qualities.

5.4.11 Integrated pest management

The Museum will implement an integrated pest management policy through:

- Rigorous pest monitoring procedures, including checks in difficult to access areas
- Separation of food and drink from collections areas
- Management of environmental conditions
- Appropriate conservation cleaning regimes
- Staff and volunteer training
- Remedial action when required.

5.4.12 Sustainability

The Trust is committed to sustainable practice. The sensitive nature of our site, our work and operating processes will therefore not impact negatively on the environment. For example, removal of old anti-fouling or lead based paints on boats will be carried out in controlled conditions , e.g. within a temporary cover, and according to safety and environmental procedures designed to prevent damage to the lake environment. Disposal of ash, oil or potentially damaging materials used during the operating or the conservation process will be managed in accordance with environmental guidelines to avoid pollution. No bilge water will be discharged into the lake and we will use a pumping system to remove all excesses of oil and coal dust directly from the vessel to the storage tank on shore.

5.4.13 Object movement and recording

Where items or components are removed, they will be labelled and recorded under the Museum numbering system, which enables parts to be associated with the original object. Location tracking will be via:

- Collections database
- Movement records
- Exit and entry books
- Control of access to/authority to move objects.

It is essential to record information about original assemblies and structures before any part is moved. The Museum will use the following methods to record historic data or the arrangement of dismantled areas:

- Photographic records
- Scans

- Drawings
- Lines plans and construction drawings
- Engineering drawings
- Video recordings
- Worksheets and logbooks.

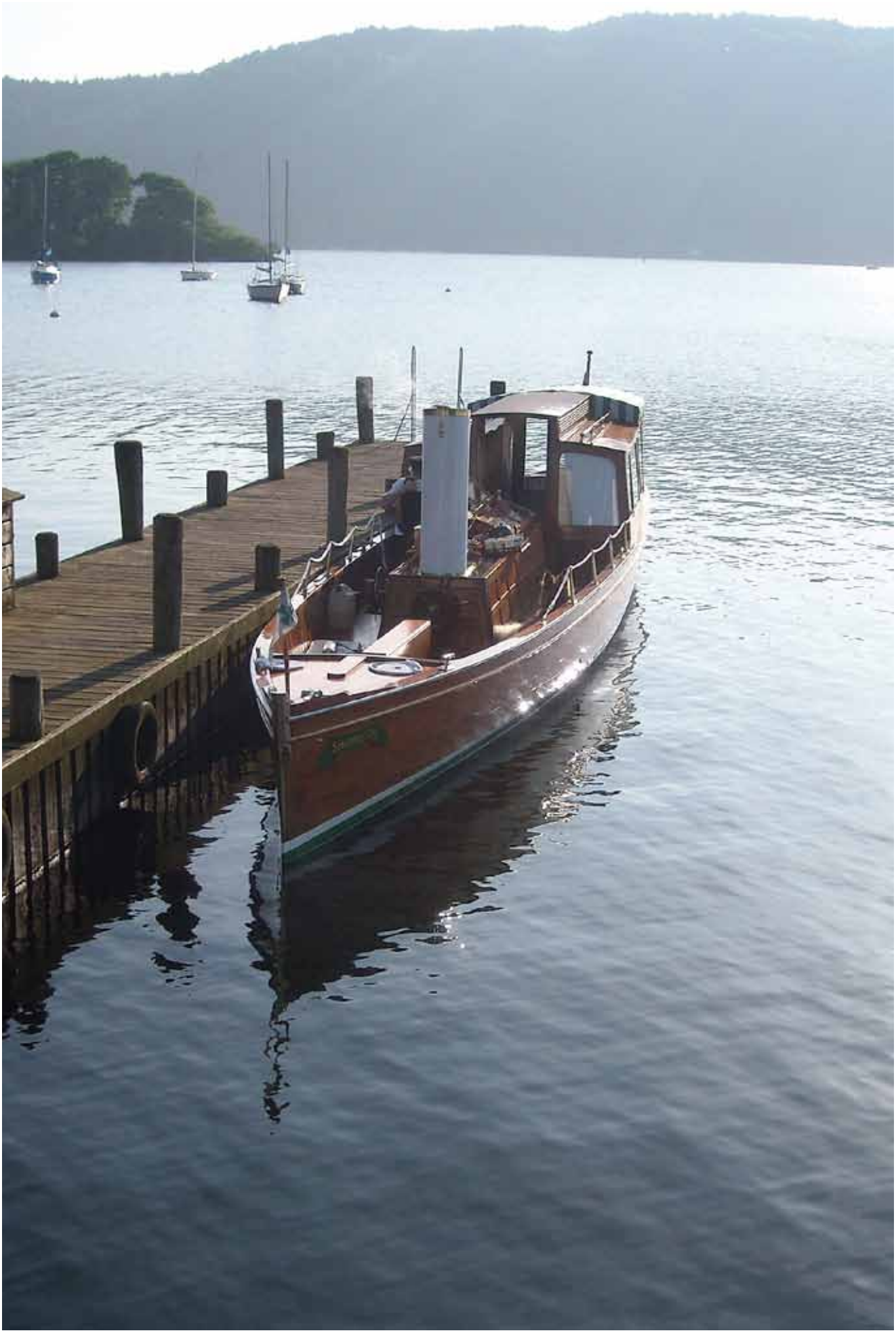
5.4.14 Maintenance

The Museum will maintain all collections and individual vessels on a regular basis, including daily checks, periodic and annual maintenance, and in-depth quinquennial surveys. The Museum will use detailed recording sheets for understanding and evaluating each vessel. Preventive conservation and a 'conservation cleaning' approach will be applied. We will prioritise monitoring and condition checking and balance essential dust removal and maintenance of polished surfaces against the increased level of access and risk of abrasion that this brings.

The Museum will implement cleaning regimes according to individual vessel or object needs. This will include:

- The nature of conservation treatments
- Surface protection or paint system
- Levels of daily wear and tear.

Individual method statements and the monitoring and maintenance plan give further detail.
Maintenance regimes will also take into account the requirement to renew surface protection on objects. Further detail is given in the Monitoring and Maintenance Plan.



Privately owned SL Swallow at Windermere Steamboat Museum © Lakeland Arts Trust

5.5 Conservation Method Statement 1: Stabilisation

5.5.1 Criteria for selection

The Conservation Management Plan demonstrates that the conservation of the collection is a complex and long-term process. We have developed the initial conservation programme to prioritise resources according to need and significance of the boats. This approach also allows sufficient time for research and informed decision-making before interventive work commences.

As a result, a number of vessels and vessel parts will require stabilisation and careful monitoring whilst awaiting full conservation treatment. This method statement outlines the processes for applying stabilisation and preventive conservation techniques to the whole collection, whether on display or in store. This approach secures the collection enabling further conservation work to be undertaken in the future. It is one of the aims of the project that the conservation of the collection is part of the visitor experience of the Museum. This approach enables the long-term programme of conservation to be central to engaging with diverse audiences and developing excellence in heritage conservation skills as well as a key part of the interpretation strategy.

In developing a method statement for stabilisation, we have consulted with conservation experts on a range of materials, traditional boat builders, surveyors and master shipwrights involved in conservation projects. We have also drawn on standard preventive conservation practice and the advice given by National Historic Ships in *Conserving Historic Vessels*.

This method statement can be applied to all vessels in the collection irrespective of the criteria applied to other method statements.

5.5.2 Location

Vessels awaiting full conservation and to which this method statement applies will be stored in a number of locations. The table below summarises potential locations and anticipated levels of visitor access, as this affects our approach.

Conservation Gallery	Visitors will view the boats and associated interpretation from the other side of low display cases or barriers. Interpretation will enable visitors to see elements that would not otherwise be visible. There will be access to information on line.
Wet dock	Visitors view boats from the high level walkway or through managed access to the lower jetties. Interpretation will be on site and on line.
Outside, on land or water	Visitors view the boats from a distance across the slipway or from land with managed access. Interpretation will be on site and on line
Storage	Virtual access via Museum website and occasional managed special access tours.

5.5.3 Environment

Relative humidity

Organic materials

We have specified the relative humidity and air temperature parameters for the exhibition gallery to meet the collective conservation requirements of the collection and these are explained in our general method statement.

As part of our stabilisation measures, we will consider the specific needs of each boat; we will monitor the movement of vulnerable elements as part of our maintenance plan and apply localised protective measures if needed. This includes creation of micro-climates for certain areas of concern e.g. deadwoods and stems, or application of borate solution, wood preservative or woodworm treatment. Microclimates can be created through temporary skirts with dehumidification or humidification. If necessary, specific elements at risk, which can be safely detached, will be removed, recorded and stored in conditions best suited to their long-term preservation.

Metals

We are aware of the impact of chloride contamination on ferrous metal elements. Professor Stephen C. Maberly of Lancaster Environment Centre has advised that salinity in Windermere is effectively zero. The catchment does not yield many ions and there is a high annual rainfall averaging about 1.8m per year so the lake water is closer to rainwater than seawater. The conductivity (a measure of electrical conductance – linked to salt concentration) of Windermere is approximately 70 micro Siemens per cm. Seawater has a conductivity that is nearly one million times greater - approximately 50,000 micro Siemens per cm.

Ferrous metal elements in particular may require further localised protection such as conservation-sector approved waxes or oils to reduce corrosion risk. Because many of these objects will not be viewed closely or touched by visitors, there is scope for use of more robust protective coatings.

Engines will be inhibited to protect from corrosion and, where appropriate, metal elements will be removed into separate storage conditions best suited to their needs. Engines and boilers, for example will be placed whenever possible in storage with a relative humidity less than 40%. Interaction between 'incompatible' elements such as iron and oak is unavoidable in the context of the collection but will be assessed and monitored on an individual vessel basis.

For stabilised vessels in the water or out of doors, the stabilisation method will take into account the more extreme environment. For example, a vessel stabilised and awaiting further treatment outside might require a more robust paint system on the hull or need parts (wooden superstructure, or metal fittings) removing to a more protected environment. For metal hulled boats, sacrificial anodes will be used to inhibit corrosion. Anodes are used to prevent the corrosion between dissimilar metals under water. This is more prevalent in saltwater. However, we still take the precaution in fresh water. The anode is made of a weaker material which corrodes and will be replaced on a cyclical basis.

Vessels out of doors will have covers to protect against the elements and further decay, while still allowing for ventilation.

Light

Our measures for reducing light damage are explained in the general method statement. We will aim to exclude natural light, and in particular direct sunlight, in storage areas, or to use local protection (breathable dust sheets etc.) The conservation gallery will have lower light levels than the main exhibition gallery.
We have more flexibility in areas not routinely open to visitors for display. Stabilisation outdoors requires the removal or protection of light sensitive items. The Museum will monitor light levels in all areas where vulnerable objects are stored.

5.5.4 Intervention

With stabilised vessels awaiting work, we will reduce intervention to a minimum, only supporting or replacing elements which are compromising the structural stability of the vessel. No other alterations will be made. This will allow us time to carry out full research, recording and monitoring before taking decisions that could affect the fabric and appearance of the vessel.

Some items will be removed deliberately in order to place them in a safer environment, to reduce weight or for research or stabilisation off site. These will be labelled and recorded under a numbering system that enables parts to be associated with the original object. Location tracking will be via collections database movement records, exit and entry books and controlling access to storage areas. Photographic records, scans or drawings will be used to identify the original arrangement of dismantled areas.

5.5.5 Monitoring and maintenance

Whilst major work will not be carried out, regular monitoring regimes and minor maintenance will extend to all stabilised vessels. However, understanding the vessel's condition and support structure prior to going on board is paramount. Restricted access based on structural stability will be implemented. We will write Vessel Access Plans before stabilisation begins and revise them after it is complete and before routine monitoring maintenance commences. This will ensure that health and safety issues are addressed and that footwear and equipment do not cause surface or structural damage.

Monitoring will include:

- Checks for physical integrity of the vessel, loss or damage to parts and monitoring and recording of movement of wooden hulls
- Monitoring and treatment for insect damage and rot
- Routine environmental monitoring, and targeted readings, for example wood water content readings
- Maintenance of surface protection and regular removal of dust, grit and damaging accretions
- Maintenance of surfaces of metal hulls, checks for corrosion and replacement of sacrificial anodes
- Checks for leaks, manual or automatic pumping out and maintenance of associated systems.

5.5.6 Future options

It is our aim, in stabilising vessels awaiting conservation, not to eliminate any future options. We are aware of current advances in conservation science and research techniques and accept that the potential for future development may impact on our understanding of and interpretation of the vessels.
Future options could involve loans to another museum where appropriate, e.g. where a vessel has strong links to another collection, and provided the museum meets the required standard of care.

5.6 Case study 1: Stabilisation Dolly 1850

This case study demonstrates how we will apply the stabilisation methodology above to a specific vessel.

SL *Dolly* was, when operating, believed to be the oldest operational mechanically steam powered vessel in the world. Her status is recognised in her inclusion in the elite National Historic Fleet.

At approximately forty years older than the other wooden launches in the collection, she was clearly designed and built for pleasure, with extremely appealing sweeping lines. She sank on Ullswater in the Great Frost in 1895, was discovered accidentally by divers in 1962, brought up from the lake in a

dramatic salvage operation and restored to use by George Pattinson, using her original engine and boiler.

Her engine and boiler are an excellent example of early steam technology. The boiler is significant for its use of early safety valve operation and her engine for its demonstration of Stephenson's linked valve gear.

5.6.1 Criteria for selection

Built of larch or pine on oak frames, SL *Dolly* has a clipper bow and counter stern and a length of 41' and beam of 6'6". She is fitted with a single cylinder engine.

Dolly's age and design make her particularly interesting as an original example of early steam launch design. Not only does she embody the technical advances and experiments in the earliest years of steam on the lake, but she also survived a dramatic salvage operation 50 years ago.

At 163 years old, with her original frames and planking, the hull and engine are too significant and fragile to justify a return to wet display or operational use. Because we need time to carry out detailed research and vessel surveys and materials analysis, we are selecting her for stabilisation before conserving her for dry preservation. The full conservation project will have significant potential for interpretation and outreach.

5.6.2 Location

Dolly is currently located in the temporary store, once stabilised, she will be displayed in the conservation gallery.

5.6.3 Environment

The controlled conditions in the conservation gallery will be suited to her wooden structure. While the environment will be more stable than in the temporary store, there is still concern about hull movement. Tests based on the ability to turn the propeller at different humidity levels have shown movement around the stern tube area.

5.6.4 Intervention levels

Surface

We will remove all the paint from the vessel and determine a preservative strategy for the woodwork, curing all areas of decay. Interpretation will address these issues as part of an explanation of the techniques for researching *Dolly's* history and structure.

Structure

A major concern was the structural integrity of the hull and its response to pressure tests revealing excessive plank movement and many areas of softness showing decay.

Initial surveys revealed that operational use would require extensive rebuilding of the entire hull structure. *Dolly* will therefore be placed in the conservation gallery in stable conditions whilst we continue our investigations and plan the detail of a future preservation project.

Further investigation into the hull is required so we will:

- Contact chemists and manufacturers to determine the composition of the caulking and (post 1962) paint and to gain any information possible about the treatment applied to the hull post salvage.
- Gain advice from wood experts on the wood used for the hull and superstructure
- Take wood samples at carefully selected points, for analysis and timber dating, provided we deem the knowledge gained is worth the intervention
- Contact metallurgists to investigate into the state of the iron fixings and the interaction between iron and oak,

for example the iron stem band. This will enable us to make a decision on the best preservation method.

- Consult with timber preservation specialists, following information gained from the chemical analysis, to ensure that new preservation will not react adversely with earlier treatments
- Compile and analyse all survey results and consult with National Historic Ships networks and relevant societies in order to ascertain the best route for dry preservation.

Engineering
Dolly's original engine and riveted boiler survive, although the engine shows clear evidence of delamination as a result of its long period underwater. Both engine and boiler were used post- salvage, although the boiler was removed from operational use in the 1970s. Both are of exceptional interest to the study of early steam technology.

Operating the engine brings extremely high risk of damage to its original parts, so we will stabilise the engine and research the most appropriate means of dry preservation.

Engineering elements will require conservation, consolidation and surface protection and it is anticipated that the boiler and engine will be displayed separately from the boat, to reduce weight on the hull and make the most of interpretation opportunities.

Further investigation into the engineering and stern gear is required, as follows:

- The condition of the propeller is unknown so we will seek technical advice on its structural stability and how to preserve it.
- Further information is required on the impact of immersion in water on the engine so we will seek advice from metallurgists (detailed work already carried out on the boiler)
- Taking into account the results of the above surveys, we will implement a plan for the best protection for the engine and boiler in the gallery

Associated objects
Items associated with *Dolly* include her original lifebelt, stern flagpost, engine housing, funnel, boiler, spanner, whistle and engine.

5.6.5 Monitoring & maintenance
All areas will be monitored for movement and moisture content, but we will focus on vulnerable areas such as the stem, deadwoods and forefoot and apply localised protection if needed. The state of the iron fixings in the oak is of particular concern and a priority for condition monitoring, both because of their intrinsic historic importance and the implications of their failure for the overall structural stability of the vessel.

5.6.6 Future options
Stabilisation of vessels provides time for the Trust to carry out further investigatory work and plan complete conservation plans for each of the vessels within the collection. Once stabilised, further research into the history of *Dolly* and interrogation of the vessels condition will be carried out. A fully informed proposal for the vessel following the preservation methodology will then be applied.

5.7 Conservation Method Statement 2: Preservation

5.7.1 Criteria for selection

'Preservation is the process recommended for a vessel when her fabric is judged to be of such significance that as much as possible of it should be kept This conservation technique produces an integrity that can only be maintained for any length of time by sacrificing operational use' .

Boats will be selected for preservation out of the water for the following reasons:

- They are no longer suited to wet display without significant intervention into original fabric
- Their significance or fragility means we cannot justify the risk of operational use

In doing this, we are acknowledging the immediate and longer-term impact on a historic vessel of preparing/ maintaining it for wet display or operational use. Preparation for operation may require replacement or modification of original features, as well as an increased programme of routine maintenance, which can gradually remove historic material over a longer period of time.

In deciding on vessels suited to preservation, we will consult with National Historic Ships, heritage professionals, surveyors, master shipwrights and boat builders involved in conservation projects. We will also make considered use of detailed vessel surveys and research.

5.7.2 Location

Vessels selected for preservation will be displayed in the exhibition gallery. A central 'dry dock' holds one large vessel, while others will be displayed off the floor on custom-built supports. Additional support will also be considered where the weight of boilers and engines will put too much strain on the hull. Some objects will be suspended from the ceiling, and some against the wall, with conservation advice on the best means of support. While there will be other interactive and touchable elements in the museum, visitors will be asked not to touch the preserved historic vessels on display. This is because of the cumulative risk to the boats' historic surfaces and structures that comes from high volume of visitors to the Museum. There is a risk that visitors have oil and silicone based products on their hands that can have an adverse effect immediately and in the future.

5.7.3 Environment

Relative humidity

We have specified the relative humidity and air temperature parameters for the exhibition gallery to meet the collective conservation requirements of the collection. Further detail is set out in the general Conservation Method Statement (CMS). Because the RH levels are aimed at the needs of organic materials, we will provide protection for ferrous metal elements in particular, in the form of conservation-sector approved waxes or oils to reduce corrosion risk. In doing this, we will consider, on a case-by-case basis, visual impact and the closeness of visitor access as well as conservation requirements.

The exhibition space will be heated by an underfloor heating system. The heating has been designed to have minimal effect on the collection immediately off the ground. The cradles will raise the boats sufficiently off the floor to avoid any potential effects from the heating. We will monitor hulls for movement and use heat deflection as appropriate.

Light

Our method statement for light control is set out in the general CMS and will relate to all preserved vessels. Localised protection will be used whenever possible to reduce light levels during daylight hours when there is no visitor access.

5.7.4 Intervention

Surface

Our approach towards surface finishes and structure for preserved vessels will be low-intervention wherever possible. We acknowledge that the boats in the collection have been maintained to working standards for the majority of their lives, including, for some, the period after they had stopped being used for their original purpose and were in operation for the old museum. The nature of their continued regular use and their maintenance to working standards means that, in most cases, little original surface material remains. This makes it more important to be cautious in the approach, in order to retain the remaining original surfaces, or any valuable historic evidence beneath modern paint and varnish layers.

Where damaged, inappropriately applied or historically inaccurate surface applications are present and causing damage or obscuring understanding or appreciation of the object, we will discuss their careful removal on a case-by-case basis, with the above concerns in mind.

We value the patina of age on vessels and their fittings, and any evidence of their former use, and we will aim to preserve and interpret that where possible. This may mean that metalwork on preserved vessels is not maintained daily to a shipshape shine, but is polished to a lesser level using low-abrasion cleaning techniques and a build-up of protective waxes. As well as reducing the risk of gradual erosion of soft metals, this also reduces the risk of damage to surrounding parts through inappropriate cleaning or increased access for surface maintenance. The combination of preserved and operational vessels will enable visitors to encounter different levels of finish across the Museum.

Structure

Our approach towards structural repairs will be to aim for the lowest possible intervention, while acknowledging that removal or replacement of small amounts of original material may be needed (removal of rot or corrosion; replacement of failed structural elements) to preserve the whole. Definitions of the end of a vessel's original 'working life' will be highly relevant when making these decisions . However, the recent history and maintenance of our vessels means that a consistent approach to defining this will be difficult to achieve, so every action will need to be addressed on a case-by-case basis.

Due to commercial and time pressures, and to lack of access without dismantling the whole vessel, some repairs pre-2007 do not reflect maritime conservation best practice. When considering such recent repairs which could be historically inappropriate, harmful or obstructive to an appreciation of the vessel, we will weigh up the benefits of removal or replacement. We will aim for reversibility in making any additions, will distinguish between original and introduced material and will record our actions. Historic 'weaknesses' will be retained and interpreted as part of the vessel's history.

Operational elements for static preservation display will be reassembled with care to achieve an authentic and meaningful assembly, but will not be restored to operational use. For preserved engines which are an important example of a particular type, it may be considered important to achieve as authentic a reassembly as possible for research and interpretation purposes. In this case, where essential components are missing or have been replaced with inappropriate modern parts, we will consider replacing them with components of the same date and manufacturer (if available), or replicas made to the original specification.

5.7.5 Monitoring and maintenance

Preventive conservation and a 'conservation cleaning' approach will be applied. We will prioritise monitoring and condition checking and balance essential dust removal and maintenance of polished surfaces against the increased level of access and risk of abrasion that these bring. Areas in greater proximity to visitors may need monitoring and maintaining on a more regular basis. Regular in-depth condition inspections will be planned on a cyclical basis.

5.7.6 Future options

The preservation route conserves as much original fabric and evidence for as long as possible. We will take advantage of future advances in conservation science and research techniques and review our care of preserved objects according to any new insights that they bring.

5.8 Case study 2: Preservation Branksome, 1896

This case study demonstrates our application of the preservation methodology to a specific vessel.

Built by Brockbanks on Windermere, *Branksome* with 50' full length varnished teak planking, and irreplaceable wide teak panels, set the standard of luxury for wooden steam launches on the lake.

High quality bespoke brasswork and castings, and ornate filigree carving on bow and stern combine with extravagant interior fittings and furnishings to match her stunning design and lines. The entire vessel reflects the luxury lifestyle of a flamboyant lake socialite.

Her triple expansion engine built by Sisson of Gloucester is a fine and significant example of steam launch marine engineering.

Branksome is the epitome of Victorian opulence and extravagance. Preservation means we are able to display, in a controlled environment, a vessel complete in every detail from tasselled Parisian velvet to engraved silver tea service.

This route involves minimal intervention in order to preserve all of her original material.

5.8.1 Criteria for selection

Carvel built of teak on oak frames, SL *Branksome* has a counter stern with a length of 50' and beam of 9'. She is fitted with a compound engine built by W. Sisson & Co. Gloucester in 1896.

Lily (later renamed *Branksome*) was built by George Brockbank of Windermere for a wealthy widow, Mrs Edna Howarth of Langdale Chase who named the boat after her daughter, and commissioned filigree carving of lilies on the bow. Her design specification matched the extreme elegance of Mrs Howarth's new home and boathouse. *Branksome's* exceptional significance lies in her high level of surviving original material, so she has been selected for preservation.

5.8.2 Location

Branksome is currently located in the temporary store. Once preserved the vessel will be displayed in the central dock in the main exhibition space.

5.8.3 Environment

Through preservation in the main exhibition space the vessel will remain stable and in controlled light conditions. The most light sensitive material will be inside the cabin where levels are lowest.

5.8.4 Intervention levels

Surfaces

The boat currently has layers of accumulated borate and grime which will need removing before we can achieve a full assessment of the surface condition. None of the exterior varnish is original and has been applied over damp wood, causing trapped moisture under the varnish. This will require removal and revarnishing. All of the interior surfaces are original and will be undisturbed.

Structure
Branksome is substantially larger than the other wooden launches in the collection but is still lightly built, combined with a lack of longitudinal and transverse stiffening. These issues, together with the engineering situation described below, mean that there would be substantial intervention to her structure required if we were to return her to operational use. This would involve additional strengthening, some new planks, disruption to the misaligned stern gear and propeller shaft in order to rectify engineering faults. We would also need to consider separate display for her more vulnerable original fabrics and fittings, in the interest of their long term preservation.

In opting for preservation, we reduce the need for substantial hull work. The hull misalignment and light Windermere construction can remain unchanged, providing a fascinating insight into the unique build of our launches.

We know from investigations into similar panels on other vessels that the characteristic alternating pattern of teak and American black walnut can be problematic because of the walnut's particular susceptibility to rot. We will remove, examine, treat and revarnish all panelling and other areas which have been varnished over damp wood.

Engineering
SL *Branksome* is fitted with her original compound engine, no 502, built by W. Sisson & Co. Gloucester in 1896. The riveted side fired locomotive type boiler was made in 1970, the original being lost. The engine and boiler are significantly heavier than the other wooden steam launches, and the propeller is the largest. As with the other wooden launches, the stern tube and propeller shafts show clear evidence of misalignment problems. In order to operate the engine without experiencing serious vibration problems, substantial work to the hull and stern gear would be required.

Associated objects
An additional benefit is that we can display all the associated original material on board *Branksome*. The fine Parisian velvet seat covers, which are currently stored separately from the boat, show evidence of wear and tear from use and will require cleaning, reattachment of fringes and support. Tablecloths and an extremely fine maid's cap and apron require cleaning, relaxing and support. We will require some replica items, such as curtains and a new awning.

5.8.5 Monitoring and maintenance
The physical condition of hull and superstructure will be regularly monitored as set out in our method statement. Targeted environmental readings will be required in areas where there is concern over microclimates, for example on top of the stern tube inside the cabin. Preventive conservation and a 'conservation cleaning' approach will be applied. Further detail is given in the Monitoring and Maintenance Plan.

5.8.6 Future options
The preservation of *Branksome* will ensure the vessel is maintained in its current condition in perpetuity. We will adjust our care of her to take into account new insights into vessel preservation and care of the contents.

5.9 Conservation Method Statement 3: Restoration Static wet display

5.9.1 Criteria for selection

We know visitors to the Museum value the importance of seeing Windermere boats on Windermere. Seeing them afloat is hugely beneficial in enabling the vessel to be understood in its original context. Static wet display allows boats to be seen in the water but without the additional risk of operation.

However, as with operational boats, it is our responsibility to ensure that vessels on wet display have passed a full hull condition survey. We will also ensure that we have sufficient resources to monitor their condition and maintain it, and that we have a policy in place for deciding when wet display is no longer appropriate. Wet display may require less intervention into historic fabric than operational use, but the effect on original material of preparation and future maintenance must still be assessed.

In making these decisions, we will consult with relevant specialists, study vessel surveys and constantly review the work done by other maritime heritage organisations to keep their historic vessels afloat.

5.9.2 Location

Static floating vessels in the wet dock will be viewed from the high-level walkway and lower level jetties. The lower level access will enable a more detailed close view of the boats. There will also be managed access on board some of the static boats.

5.9.3 Environment

The boats will be in the environment for which they were designed. The environment in the wet dock is not controlled but it will protect boats from rain and sunlight and extremes of temperature. In addition to protective coatings applied during conservation, localised measures such as installing heaters for boilers during the winter will be implemented depending on dew point and ambient temperature, which is uncontrollable in the wet dock.

5.9.4 Intervention

Surface

Because boats are being prepared for wet display, we accept that a degree of intervention is required. Varnished and painted surfaces may require removal, and re-application, but this will be assessed on a case-by-case basis. As with operational boats, we will use modern oil based varnish with UV resistance, applied by brush for a traditional high gloss finish. We will favour a low abrasion polishing technique for non-ferrous metals, preserving historic evidence, deciding on an appropriate level of finish through careful testing, then polishing through selected abrasion grades and maintaining it to a set programme.

Structure

Most work for both metal and wooden vessels will usually be in the hull area. Damaged, rotten, corroded or inadequately repaired areas will be replaced if required for the stability and longer term preservation of structure. However, if the level of intervention is considered too great, an alternative to wet display may be considered. For boats that are not operational, there may be reduced requirement for additional strengthening, although the weight of boilers and engines still needs consideration. Every decision will be based around a desire to preserve original material for as long as possible. Historic fabric that is removed will be recorded and preserved.

As with operational boats, additions and modifications will be carried out to a high specification in the traditional manner and with historically appropriate materials. New work will be recorded and distinguished from historic fabric.

Engineering
Engines will be placed in static display vessels in order to enable visitors to appreciate them and understand the vessels better. They will require good surface protection in order to prevent corrosion and that some particularly vulnerable parts might need removing. Operational elements for static wet display will be reassembled with care to achieve an authentic and meaningful assembly, but will not need to be restored immediately to operational use. In this case, where essential components are missing or previously replaced with inappropriate modern parts, we will consider replacing them with components of the same date and manufacturer (if available), or replicas made to the original specification. However, this will be done for the purpose of display, and with to the focus on interpretation rather than operation.

5.9.5 Monitoring and maintenance
Regular monitoring and maintenance will include:

- Underwater checks
- Regular out of water inspections, at intervals depending on hull construction, to include hull surface and paintwork, including stern gear
- Cleaning the bottom of the boat at least annually; no antifouling paints will be used
- Checking anodes if fitted and monitoring for any signs of electro-chemical decay
- All vessels will have a 12 volt automatic bilge pump with emergency light independently attached
- Monitoring of environmental conditions inside the hull and maintenance and adjustment of ventilation, e.g. opening locker doors and lifting cushions
- Cleaning and checking surfaces according to a strict preventive conservation programme

5.10 Case study 3: Restoration: Static wet display Lady Elizabeth, c.1895

This case study demonstrates the application of the above method statement to a specific vessel.

Lady Elizabeth clearly reflects the graceful and aesthetic qualities of a vessel that conforms to the natural laws of hydrodynamics as designed by an experienced naval architect.

The high level of experience that went into the design details of this small vessel, with its original counter stern and beautiful lines and proportions, makes it extremely significant. There are few surviving boats of this size where there is such attention to aesthetic detail.

It is very rare to find a surviving vessel of this size, especially with so much of her original oak interior still intact. The quality of the design and build, and features such as the original lifting rings and hatches at her bow and stern, point to her former use as a luxury yacht's tender

Her Lune Valley boiler is of great significance as it was developed by local Windermere inventor, Jack Kitchen. Because of the structural integrity of the hull, this graceful vessel can be safely displayed in the water, where she will be best appreciated.

5.10.1 Criteria
SL *Lady Elizabeth* is 18' long, with a 5'3" beam, vertical bow and counter stern. She has a single cylinder steam engine with Stephenson's valve gear and a Lune Valley boiler fired by paraffin and believed to have been built by Lune Valley Engineering in 1910. She requires little intervention for static wet display and will be best appreciated in the water.

Lady Elizabeth is important to the collection as a representation of a much smaller steam launch and as an example of boats brought to Windermere from abroad.

5.10.2 Location
Lady Elizabeth is currently located in the temporary store. Once conserved, she will be on display in the wet dock.

5.10.3 Environment
The protected environment of the wet dock will be suited to the vessel once it has gone through the conservation programme in the workshop.

5.10.4 Intervention
Surfaces
The hull will be repainted. The varnish is generally good and will be cleaned but otherwise left intact, although some small areas may need further attention. We wish to avoid sanding for revarnishing. Metal features will be cleaned and protected with the wet dock environment in mind, in a similar way to operational vessels.

Structure
We will aim to disturb as little as possible of *Lady Elizabeth's* hull.
Anticipated work will be as follows:

- Only remove paint on topsides and hull bottom, in order to see the condition of the hull
- Apply wood preservative if required
- Any necessary repairs to hull planking, fastenings and caulking
- Survey under gunwales, requiring removal of frame covering panels and seats
- Check poorly ventilated areas in bow and stern
- Research and replace lost sole boards and gratings, missing hatch and section of rubbing strake
- Examine stem band and decide whether it needs replacing
- Full paint specification applied to topsides and hull bottom
- No antifouling will be applied.

Engineering
The boiler and engine have already been placed in storage, but the pipework in the hull will need removing in order to enable access for a full survey and internal hull paint specification. The operational condition of the boiler is unknown but it will be displayed in the exhibition gallery for better visitor appreciation and interpretation. This will be beneficial for its preservation due to the more controlled environment. However, the boiler casing and funnel can be assembled and the engine parts will look as original although not functional. Engineering parts will be cleaned and protected for the wet dock environment.

Associated items
Lady Elizabeth's boiler, engine, steam kettle, funnel and the majority of the engineering parts are currently listed, numbered and stored separately. The remainder will be recorded, according to documentation policy, before removal to facilitate hull access.

5.10.5 Monitoring and maintenance
Metal elements will have a reduced requirement for polishing as there is less visitor access, and the boat will not be going outside the wet dock. Particular monitoring of engine and associated parts will be necessary for humidity levels. Other maintenance will be as detailed in the method statement above.

5.10.6 Future options

The Museum will carry out regular monitoring and maintenance of *Lady Elizabeth*. In the longer term, we will consider applying the operational methodology to *Lady Elizabeth* to enable the vessel to be used for demonstration. The information gained in reinstating the engine and inspecting the boiler will enable us to gain a clear idea of the work required to do this and whether it is a viable route. We anticipate that it will be.

5.11 Conservation Method Statement 4: Restoration Operational

5.11.1 Criteria for selection

By offering visitors a first-hand experience of a working Victorian or Edwardian steam launch, we bring alive the whole collection and enable the vessel to be understood in its original context. A trip on one of the Museum's boats offers a unique and exciting opportunity to understand the build, operation and maintenance of a Windermere steam launch. The experience of such close contact with a unique historic working vessel is very special.

However, it is the Museum's responsibility to ensure that any vessel selected for operational use is fit for purpose, that we have sufficient resources to monitor its condition and maintain it appropriately, and that we have a policy in place for deciding when operational use is no longer appropriate. We will also consider the level of intervention into historic fabric in order to enable the vessel to be in commercial use and the impact that future maintenance will have on original material.

In making these decisions, we will consult with relevant specialists, study vessel surveys and constantly review the work done by other maritime heritage organisations to keep other historic vessels in an operational state. A list of vessels considered for operational use is given at the end of this section.

5.11.2 Location

Operational vessels will be located in the wet dock. They will carry up to 12 passengers, with additional trained crew, at a limited number of planned intervals throughout the day. Additional special trips may also be scheduled from time to time. Visitors will have access to forward and aft seating areas but will not be allowed to move between the two once they are seated. They will be able to sit, touch and enjoy any part of the boat that does not pose a safety risk but will be made aware of the fact that this is still a unique, fragile historic vessel. They will be encouraged to wear soft soled shoes, with no sharp heels allowed and will board the vessel as instructed by the crew. There will be guidelines on consumption of food and drink and procedures for prompt removal of crumbs and spillages. We will consider the use of mats and footwear protection to reduce excessive grit and dirt.

5.11.3 Environment

The environment in the wet dock is what they were originally built for and will protect the vessels from severe weather conditions. However, we are aware of the following when deciding operating schedules:

- They have already been preserved substantially longer than was anticipated by their designers and builders
- They were originally built for fair weather excursions and light social use, not for commercial operation
- We have an ethical duty to preserve them as long as possible for future generations.

Operating procedures set out weather conditions in which they will not operate, for example when winds exceed force 4. The choice of surface finishes will reflect outdoor use, with traditional oil based single pack varnishes selected for their UV resistance, and robust but manageable surface protection for metalwork. Maintenance regimes will be designed to mitigate the effects of adverse weather and reflect the level of use.

When not in operational use, vessels will be made safe, moored by trained crew and kept under cover in

secure conditions in the wet dock, taking into account temperature and humidity. The business plan for the Museum includes provision for the conservation team including a full time engineer. In addition to this a skipper and crewman will be responsible for the operation of the vessel used for public trips. Further detail of the resources required is given in the management and maintenance section.

5.11.4 Intervention

Surfaces

Because the boats are being prepared for operation, we accept that a higher level of intervention is required. Varnished and painted surfaces may require removal, and re-application, but this will be assessed on a case-by-case basis. For maximum fabric protection, we will use modern varnish with UV resistance, but it will be applied by brush for a traditional high gloss finish, with a tolerance of brush marks if they are considered appropriate to the original finish on the vessel. We will favour a low abrasion polishing technique for non-ferrous metals, preserving historic evidence, deciding on an appropriate level of finish through careful testing, then polishing through selected abrasion grades and maintaining it to a set programme.

Structure

The highest level of intervention is likely to be in the hull, especially when working with our larger wooden steam launches which were lightly built and, in most cases, have experienced substantial operational use and issues resulting from stern gear misalignment. Damaged, rotten or inadequately repaired areas will be replaced if required for the stability and longer term preservation of structure, for safety reasons or for functional use. However, every decision will be based around a desire to preserve original material for as long as possible and historic fabric that is removed will be recorded and preserved. We are aware that some compromises may be required to ensure passenger safety or meet insurance requirements, but will keep the historic integrity of the vessel at the heart of decisions.

Reversible additions may be required to give longitudinal and transverse strength to vessels originally designed for lighter use and to prevent future damage to the hull. This is a key decision which will require research, discussion with the whole project team and input from external specialists. We will interpret the reasons behind these decisions in the new museum.

Additions and modifications will be carried out to a high specification in the traditional manner and, as far as possible, given health and safety and insurance requirements, with historically appropriate materials. New work will be recorded and distinguished from historic fabric.

Engineering

When deciding whether to operate an engine, a complete understanding of its design and operation is required in order to develop an accurate risk assessment relating to its use.

- The complexity of castings, age, design and significance of engines will differ in every case and between steam and combustion. Each must be considered individually, with specialist advice and clear evidence when appropriate.
- In order to examine an engine for operation, parts will require dismantling, and the method should be assessed on the ease or otherwise of removal and risk of damage during the process, for example stripping threads or breaking studs.
- A visual inspection and research into associated records and log books, and risk assessment for every aspect of the dismantling process is required before it commences.
- If inspection reveals that changes to or replacement of parts is required, a further assessment of the impact on originality is required.
- We are aware that some items, for safety reasons, will require replacement on a routine basis. The

originals will be recorded and kept in store (e.g. high pressure steam pipes).

- If there is any doubt as to whether the engine can operate without causing damage to persons or historic material we will not operate it.
- All work will be recorded through photographs, videos, engineering drawings, recording worksheets and logs.
- Prior to any engine start, the engine will be rotated manually with steam engines decompressed or spark plugs removed on combustion engines.

5.11.5 Monitoring and maintenance

The maintenance programme will take priority over operational use. The capacity and resources of the Trust will be considered when deciding to implement the restoration for operation methodology. Daily inspections will be carried out according to a detailed checklist for each area on board, as detailed in the management and maintenance schedule. Maintenance will be on a very regular basis so issues are not aggravated.

The Museum will mitigate risk to operational boats.

Crew training will be given in the following areas:

- Vessel operation, to include general seamanship and specifics of steam and combustion engine operation and propulsion
- Local conditions, lake features and topography
- Emergency procedures and radio communication
- Historic significance and preventive conservation.

An emergency plan will be in place, supported by regular training, to include measures for protecting wet dock vessels in the event of an emergency. Preventive conservation measures will be in place to reduce risk of damage to historic surfaces. The wet dock will provide a secure environment for mooring operational vessels.

5.12 Case study 4: Restoration Operational SL Osprey 1902

Osprey is one of the finest examples of Edwardian elegance in steam launch design and craftsmanship. She demonstrates the art of traditional boat building of the highest quality with an extremely complex canoe stern

Her Sisson engine, no 591, was once on loan to the Victoria and Albert Museum as an example of technical advances in engine design and represents a type of engine popular with Windermere steam launch owners.

A working steam launch is an essential part of understanding the collection in an operational museum. *Osprey* was identified in 2012 as a good choice for operation.

5.12.1 Criteria for selection

Carvel built of teak on oak frames, *Osprey* has a canoe stern with a length of 45'9" and a beam of 8'1'. She is fitted with a compound steam engine built by Sisson of Gloucester. *Osprey's* engine and boiler are in good condition.

The Trust's desire for an operational boat to fit with the ethos of the museum, and the selection of *Osprey* as the best candidate, was agreed with National Historic Ships.

The majority of interventive work required for putting her into the water would have been necessary in order to stabilise the stem, keel, stern and hull from further damage. With a clear understanding of the canoe stern construction, the failure to carry out restoration would have led to unacceptable loss of original hull fabric.

5.12.2 Location

Osprey has been undergoing restoration since 2010 in the temporary conservation workshop with the conservation workshop manager and workshop assistant. She will be in operational use, moored in the wet dock.

5.12.3 Environment

Conservation of the vessel takes into account the outdoor environment and conditions in the wet dock.

5.12.4 Intervention levels

Structure

Osprey was clearly in a less stable condition than the other boats and would deteriorate. This contributed strongly to her selection as the first vessel for conservation.

- Seven hull planks in total in the bilge area had been replaced pre-2007 incorrectly using low grade material and rot was clearly evident. These were removed and replaced with original teak planking.
- The stem was not original and had suffered from high impact with 5 poorly fitted plank sections each side; large amounts of tar had been poured inside the stem to substitute for the lack of wood support. This was removed and replaced with a traditional curved oak stem.
- The keel had been replaced in sections and was not holding the vessel in shape to the internal hog, meaning full keel replacement was necessary.
- The stern area had suffered from substantial modifications and poor repairs which were clearly causing it to lose its shape. This was compounded by large areas of cracking on the stern tube sections and clear evidence of propeller shaft misalignment. As this is the most important area of any wooden power driven vessel, all features in this area had to be addressed, including the rudder and complete stern gear assembly.
- The covering boards and gunwale capping showed some fastening movement, indicating areas of active rot. These were removed to provide access for the replacement of rotten areas of gunwale.
- All of the engine and boiler support bearers and internal frames had failed, by burning and poorly rectified repairs due to lack of access. These have all been replaced in English oak.
- The forward cabin area on the starboard side had high impact damage and required removal from the vessel, a relatively simple job as it was only screwed to the gunwale. This made the fitting of longitudinal stringers considerably easier. These were going to be a new integral part of the hull structure.
- The addition of stringers to the original fabric was justified in the interest of preserving the remaining structure of the boat for the future. Clear hull failure was shown where no stringers had been fitted and, if *Osprey* was going into regular operational use, it was a necessity.

Surface

All the varnished teak surfaces are being treated with a traditional oil based varnish (Epiphanes) which has the additional quality of being UV resistant. All of the varnish and enamelled surfaces are being applied traditionally by brush.

Engineering
The engine's crankshaft main bearings were found to be badly water corroded (see image) and the crankshaft was reground to avoid further damage to the engine during operation.

The main bearings have been scraped and fitted to the new bearings on the crankshaft. During this time the crank bed plates and the cylinder blocks were stripped and repainted, based on Sisson's original colours. The stern gear items as follows were non original and were all badly worn and broken in places and of the wrong dimensions:

- Propeller
- Propeller shaft
- P bracket
- Stern tube
- Inboard gland
- Outboard gland

All parts were designed and are being replaced to the specification which will enable *Osprey* to be operated without causing further hull movement and vibration in the stern area. All of the large steam launches have a tapered shaft connection joint on the inboard end of the propeller shaft. This unique design limits vibration on the inboard end of the shaft and will be replicated as the original design specified. The boiler is not original and is a replica locomotive-type steam launch boiler with side-fired firebox. It has been pressure tested and undergone a complete paint specification.

Associated objects
Parts removed during conservation have been retained in appropriate conditions and recorded individually or in small groups under *Osprey's* unique Museum accession number. No original furnishings have survived.

5.12.5 Monitoring and maintenance
The following policies have been developed to reduce risk:

- Plan for mooring and overnight monitoring
- General operating procedures and documentation
- Engineering operating procedures and documentation
- Maintenance plan
- 24 hour emergency slipping procedures, as part of wider emergency planning
- Training plan

See also Management and Maintenance plan.

5.13 Conservation Method Statement 5: Stabilisation for Adaptive Re-use

5.13.1 Criteria for selection
Some vessels in the collection are suited to adaptive re-use. National Historic Ships define this as 'modifying a vessel to suit a proposed new use'. This can:

- Generate increased enthusiasm for and understanding of a vessel
- Enable engagement with a vessel on a longer term basis
- Aid interpretation and presentation
- Assist with raising the income required for a sustainable future
- Enable modern safety and insurance requirements to be met

An appreciation of significance and the need to preserve as much original material as possible will remain at the heart of all plans.

5.13.2 Location

Vessels selected for adaptive re-use will usually be displayed outside and be in operational use or on static display but with a significant element of interaction. The restoration, stabilisation and preservation methodologies will all be relevant to adaptive re-use.

5.13.3 Environment

For vessels in external conditions, re-use will require us to take into account the more extreme environment and the surface protection and maintenance regimes needed to protect against it. Plans for adaptation will need to consider the impact on the environment within and around the vessel. For example, controlled ventilation, dehumidification and targeted maintenance will be required.

The nature of adaptive re-use means that more sensitive original items may be better stored or displayed elsewhere and replaced with carefully researched and traditionally crafted replicas.

5.13.4 Intervention

Before implementing changes to vessel fabric, we will consider:

- Whether they are essential in achieving a sustainable future for the vessel
- Their impact on significance and original material
- Whether they are reversible and how to achieve minimal visual impact

Additions and modifications will be carried out to a high specification in the traditional manner and, as far as possible, given health and safety and insurance requirements, with historically appropriate materials. New work will be recorded and distinguished from historic fabric.

Some items from the vessel will be removed deliberately in order to place them in a safer environment. These will be labelled and recorded under a numbering system that enables parts to be associated with the original object. Location tracking will be via collections database movement records and exit and entry books. Photographic records, scans or drawings will be used to identify the original arrangement of any dismantled areas.

If adaptive re-use involves greater interaction with the vessel, particular care will be required in monitoring vulnerable sections and ensuring that loss or damage is reported promptly and action taken.

5.13.5 Monitoring and maintenance

Vessels adapted for re-use will require maintenance and monitoring regimes that take into account the specific nature of their use, in addition to the standard procedures below:

- Checks for physical integrity of vessel, loss or damage to parts and monitoring and recording of movement of wooden hulls

- Monitoring and treatment for insect damage and rot
- Routine environmental monitoring, and targeted readings, for example wood moisture content readings
- Maintenance of surface protection and regular removal of dust, grit and damaging accretions
- Maintenance of surfaces of metal hulls, checks for corrosion and replacement of sacrificial anodes
- A total understanding of the paint manufacturer's specification must be adhered to and it must be noted that, despite the vessel being stabilised, the stabilisation is ongoing.
- Checks for leaks, manual or automatic pumping out and maintenance of associated systems.

5.13.6 Future options

Our approach to adaptive re-use will be reversible and low intervention, to ensure minimum impact on vessel significance and the level of information available for future research.

5.14 Case study 5: Stabilisation for Adaptation SS Raven, 1871

This case study demonstrates how we could apply the stabilisation and adaptation methodologies to a specific vessel. In this case, we are also looking at how we would make best use of existing funds to stabilise the vessel for as long as needed. We would then be in a position to review the situation before deciding on whether adaptation was appropriate, and putting forward a project for future funding.

From 1871, *Raven* delivered all supplies around the lake: building materials, gunpowder, beer, groceries, medical supplies, coal, people and animals. She broke the ice in winter to keep transport going.

Only *Raven* had the capacity to deliver the full length wooden logs needed by boatyards and construction businesses around the lake. Her significance is recognised through her inclusion as a member of the elite National Historic Fleet.

Raven was an extension of the Furness railway and, through her deliveries, she was pivotal in the growth of communities around the lake. She is the only working iron vessel in the collection, with all of her original operational fittings, including engine and crane.

Her later uses included minesweeping training, salvage operations, social and passenger trips and she remains much loved and cherished.

5.14.1 Criteria for selection

Built in 1871 by T.B. Seath of Rutherglen near Glasgow, with a length of 72' and 15' beam, *Raven* has an iron hull with counter sunk rivets.

SS *Raven* is particularly significant within the collection as a vessel representing a working function. Her role in carrying goods around the lake is reflected in her name, which refers to the biblical story that the prophet Elijah was fed in the wilderness by Ravens. She has huge engagement potential because she was designed as a working, practical vessel and is of iron and steel construction. For this reason, she is a candidate for future adaptive re-use.

5.14.2 Location

Raven is currently moored afloat in the outside wet dock in shallow water and will be hauled out of the water onto a cradle for stabilisation.

5.14.3 Environment

The work outlined below takes into account the impact of the outdoor environment on a metal hulled vessel.

Risk

Raven is currently at risk as follows:

- Risk of sinking due to water ingress primarily through the hull and large rotten areas of the deck
- Risk of corrosion throughout the bilge area of the vessel under concrete
- Risk of corrosion on original external metalwork (crane) where painted surfaces have deteriorated.
- Maintenance access is difficult because of the need to use only reinforced areas of the rotten deck but pumps run approximately 24 hours per week.

Stabilisation

To stabilise the vessel, with a view to adaptive re-use, we plan the following:

- Remove any vulnerable metalwork to the correct environment
- Design and manufacture cradle
- Move vessel onto cradle and power wash bottom
- Withdraw propeller and investigate potential corrosion around stern gland inboard and outboard bearing
- Plan and implement removal of concrete from bilges, marking all frame and floor positions
- Erect temporary cover and put in place safety and environmental procedures to shot blast and paint hull, crane, funnel and boiler (NB hull repairs will not be carried out at this stage).

The engine will be featured in the gallery and will also require conservation and preparation for display.

After stabilisation

We will record and review new information discovered during the stabilisation programme on a regular basis. Further research will cover the following areas:

- Original paint colours
- Original deck
- Date and composition of the concrete in bilge areas.

We will re-assess the hull, and carry out further surveys on hull and supporting structures.
We will revise risk assessments with a view to the following:

- Establish authorised access
- Erect cover that will protect and enable visitors to view the crane and the hull
- Replace boiler in boat, with suitable support
- Display dorade vents, cleats and funnel within or near boat, or in gallery space
- Establish options for future re-use/adaption.

Our immediate priority is stabilisation with regard to regular maintenance. We would then be in a position to research options for potential future land or water-based adaptation so we can raise funds for a future project.

5.14.4 Intervention

Once the condition of the hull is understood following shot blasting, we will investigate future options in terms of:

- Visual impact
- Operational safety
- Impact on original structural elements
- Level of risk to historic vessel posed by fire
- Management of fire risk.

Associated items

Archival material and more vulnerable items (for example the whistle) associated with *Raven* will be displayed in the conservation gallery in controlled and secure conditions.

5.14.5 Monitoring and maintenance

The Museum will prioritise this, with particular attention to:

- A understanding of the paint system as specified by the manufacturers and its regular maintenance
- Maintenance and management of temporary covers to prevent water ingress
- Monitoring of environment inside hull
- Monitoring for corrosion.

5.14.6 Future options

Following this method statement will stabilise and care for *Raven* and associated parts. It enables the Museum to consider options for future use of *Raven*, including adaptive re-use, and how these could be funded through a future project. We recognise an adaptive reuse project for a vessel as large as Raven will require the museum staff and infrastructure to be completely bedded in and to have the proven ability to deliver this project, as well as sufficient resources.

5.15 Conservation Method Statement 6: Deconstruction

5.15.1 Criteria for selection

> *'Where a vessel has no sustainable future National Historic Ships recommends Deconstruction resulting in Preservation/Replacement by Record wherever possible because this ensures that the fullest record of a vessel possible is completed' .*

There will be some vessels in the Museum collection which cannot be preserved for ever and for which we must apply the above approach. It is important that we stabilise and record them fully and extract as much information on historic significance as possible before we lose them. This will be invaluable for educational and interpretation purposes, including training for boat building apprentices in the conservation workshop. For this reason, we will take measures to phase the deconstruction process over a longer period in order to make the most of these opportunities and access to the vessel. We will refer to the guidance by National Historic Ships in *Recording Historic Vessels* and *Deconstructing Historic Vessels* and this deconstruction programme may inform additions to the guidelines.

5.15.2 Location
Vessels selected for deconstruction could be in any location. However, as a general rule, those exposed to weather over a long period of time and are not substantially intact are most likely to lack a sustainable future.

5.15.3 Environment
Because stabilisation is key to the process of gathering information, our first step will be to protect vessels from the elements, including rain and direct sunlight. High humidity in many cases will be an advantage as far as wood is concerned. We are aware of issues with hot weather for wood but are fortunate that the local climate is naturally damp. Humidity levels will have to be taken into consideration when planning moving and recording work.

5.15.4 Intervention
We will produce and publish detailed plans for deconstruction according to the guidance in *Deconstructing Historic Vessel*s and with regard to MLA guidelines on disposal. Because deconstruction is phased over a long period, with stabilisation as the first stage, further consultation with National Historic Ships will be required as to the timing for this.

Some items will be removed deliberately in order to place them in a safer environment, such as the exhibition or conservation gallery. Larger objects will go into storage. In this we are applying the 'preservation by sectioning' methodology. These will be labelled and recorded under the museum numbering system that enables parts to be associated with the original object. Location tracking will be via collections database movement records and exit and entry books. Lines plans, construction drawings, photographic records, scans or drawings will be used to identify the original arrangement of any dismantled areas. The construction plan will be used as an ongoing working document to record removal of all parts during the deconstruction process. Every part will be photographed, measured and recorded and related to the construction plans of the vessel, including the positioning of all fastenings.

5.15.5 Monitoring and maintenance
Our priority here will be to preserve hull shape and key elements of the vessel which will be of importance to recording and research. We will focus our monitoring on those areas so we can remove and protect key elements at risk and add additional support as needed. For example, we would include:

- Regular checks of metalwork and fastenings
- Regular monitoring to check that the vessel has not started the hogging process or any other hull distortion
- Ongoing creation of temporary hull supports as necessary.

5.15.6 Future options
Records will be kept securely at the museum so the information within them can be shared freely with others. Our rigorous approach to recording and research will mean that replication is an option for the future, after deconstruction is complete. Information gathered will be used actively for research and interpretation.

5.16 Case study 6: Phased Deconstruction Ferry Mary Anne, pre-1870

This case study demonstrates how we will apply the deconstruction methodology above to a specific vessel.

Ferry *Mary Anne* is of national importance. She is believed to be the oldest ferry boat in the UK and possibly the earliest surviving public service working boat. As the last surviving rowed ferry, salvaged from the lake, she is part of a ferry service that operated on Windermere from the 1450s to the present day.

Mary Anne was left outside, unprotected by the old Museum, and the structure has deteriorated. The ferry is an excellent interpretation and engagement tool which inspires visitors to discover more about the methods and risks involved in early travel on the lake. Everyone can engage with the endearing thought of horses and other animals being rowed in the ferry across the lake.

The high degree of decay and dilapidation, her size and the resources required to conserve her mean that long term preservation is not viable and would effectively be replication. However, by following a controlled deconstruction programme we can ensure that all significant information is retained.

5.16.1 Criteria for selection

Ferry *Mary Anne's* suggested construction dates ranging from 1799 to 1860. She is 39'6" long with a beam of 11'3".

She has suffered over a longer period from exposure to the elements and damage from floods. There has been significant fabric deterioration since the ferry's salvage, but it remains our ambition to record and then to preserve its shape for accurate recording. The purpose of this is to:

- Aid understanding of a highly significant vessel
- Record significant detail before it is lost in order to allow for future research, replica, scaled replica or model
- Record and pass on information about traditional boatbuilding techniques for working vessels, as opposed to the luxury leisure vessels which would have required greater detailed drawings

5.16.2 Location

The ferry is currently protected by a temporary shelter but must be moved by July 2014 so we will place it on a moveable cradle. A cover will be extended to protect it completely from rain and sun and to allow visitors to view it.

5.16.3 Environment

Preserved parts will be either displayed in the gallery or cased and stored in suitable conditions.

5.16.4 Intervention

Stabilisation

Additional support can be added in the form of grown frames, and this process brings learning opportunities. In doing this, we are preserving it for longer, but the protection we are providing will not retard deterioration forever. There will be key parts like the ramp which will require removal and protection. These can be replaced with replicas to preserve the shape and aid understanding, but we will need careful monitoring to ensure that parts are removed before detail is lost.

Deconstruction process

The suggested process prior to start of construction is as follows, to be supported by a research plan:

- Measure existing vessel to form an immediate record
- Stabilise to preserve hull shape in order to achieve more accurate measurements at a later date.
    - This will be achieved by supporting the existing hull structure by external framing and the addition of internal frames as necessary. This process will allow for more accurate measurements of the half breadth and body sections for the lines plan.
- Seek advice from timber preservation experts on strength and treatment of timber; investigate further and carry out gentle lifting test
- Investigate and instigate most effective options for timber dating

- Design and cost cradle and supports for lifting; design cover which can protect whole vessel
- Complete lines plan, creating an additional opportunity for passing on traditional ink drawing and draughtsmanship skills
- Lift ferry onto cradle.
- Move ferry to a safe location before museum construction process begins.

The ferry will remain visible as an engagement tool during the first year of opening. This will enable us to involve students in making further lines plans and gaining an understanding of the lofting and construction.

Deconstruction will be completed by end August 2016.

5.16.5 Monitoring & maintenance

During stabilisation and deconstruction the vessel will be monitored regularly. Once deconstruction has taken place there may be some parts of the vessel that will be preserved and stored and these will be monitored through the general maintenance plan.

5.16.6 Future Options

The benefits of this approach are:

- We gain understanding of the vessel's construction and of features characteristic of Windermere.
- We have an extremely valuable opportunity to involve volunteers and local communities in first hand understanding of the process in making a traditional lines plan. Through this, the skill of the designer and draughtsman will be researched and appreciated.
- The ferry shape is recorded but is also preserved for research purposes and to inspire and involve local people in particular.
- The most significant parts are removed, and protected, so we can keep them available for research and interpretation and continue to engage with visitors and local communities over the story of the ferry.
- The ferry is a key story in the exhibition space and having detailed information on the actual size and structure of the original vessel will bring those stories to life.
- The ferry construction and the process of creating the lines drawings will illustrate many of the practices seen in the conservation workshop, for example use of traditional draughting tables of offsets, traditional lead spiling weights and wooden spiling battens.
- As the ferry is deconstructed, different aspects of its structure can be appreciated more clearly.

5.17 Engagement potential of case studies

Explaining, discussing and demonstrating vessel conservation is at the heart of the interpretation strategy and the Activity Plan. Through the projects in these case studies, the Trust will engage with visitors, local communities and other professional institutions. The Activity Plan includes plans for formal learning, informal learning, community engagement, volunteering and training; these proposals maximise the potential for engagement through the collection and the site.

Specific interpretation themes have been researched and identified, these are: *Earning a Living*, *The Great and the Good*, *Spirit of Adventure*, *Going to War*, *Just Visiting*, and *Building a Better Boat*. These interrelated themes will interpret key vessels and the overall collection, allowing visitors to learn about the people and the stories behind the boats and the social and industrial history of Windermere (the specific themes are described in more detail in section 2.4.1 of the Activity Plan and within the Exhibition Design Report).

Specific conservation projects will also create opportunities to provide exciting engagement projects involving schools, young people and communities. Some specific opportunities include:

Dolly 1850
Dolly's research and conservation process will be the focus of a special display which is updated regularly to reflect the latest research, providing a window into our overall conservation approach. An open assessment of the ethical dilemmas we face in the light of her significance and condition will help visitors understand the scale and complexity of the conservation challenges. Through interpretation and discussion, our visitors will feel directly engaged with a process which is often hidden.

Branksome 1896
Branksome provides a perfect example of how design, craftsmanship and the height of boatbuilding and engineering expertise came together to create the ultimate luxury wooden launch. She will form the focus for the display in the exhibition gallery and will provide visitors with a detailed overview of a Windermere steam launch and why it is significant. Interpretation will cover technical construction detail as well as contextual information about how she was used by her owners and operators. The knowledge gained from this one vessel will enhance our visitors' understanding of the entire collection.

Osprey 1902
Osprey will be a fully operational vessel, allowing visitors to take a unique boat trip that will enhance their understanding of the vessels and their role in the history of the lake. Watching the boat crew in action will bring an appreciation of the care and attention required to operate an historic steam vessel. Close contact with original teak panelling and the opportunity to see an original Sisson of Gloucester steam engine in operation feels all the more special for having gained an understanding of the conservation work that has made this trip possible. The boat trips will be a key part of the formal learning programme and visitor experience - the ability to show selected vessels on the water and in working order will be a particular strength of the Museum

Raven 1871
Raven brings a different scale of challenge and a unique perspective because she was designed as a working vessel. This brings huge engagement potential. Her iron and steel construction enables us to involve visitors in discussion of a different set of conservation issues. Showing *Raven* stabilised before a decision is taken on the nature of her adaptive re-use and engaging in active discussion about her future will help everyone grasp the scale and complexity of maritime conservation projects.

Mary Anne pre-1870
Ferry Mary Anne provides an opportunity to engage visitors in one of the most difficult ethical debates around the care of historic vessels. In this case, we have a highly significant vessel, but one that does not have a sustainable long term future. Through recording and deconstruction we are preserving valuable information. The Activity Plan has incorporated the Ferry as the focus of a key Community Engagement project, which will provide opportunities for hands on heritage skills, oral history, study days, art interventions and community days. The Ferry conservation project will allow the community to learn about the construction of the ferry and the insight it provides into traditional boatbuilding techniques as well as the social history relating to this type of vessel. This will be one of the first deconstruction projects carried out according to National Historic Ships UK guidelines and, as such, an extremely valuable case study which will contribute to the existing published material.

5.18 Conservation Routes

Each of the vessels in the collection has been assessed and the methodologies above have been applied in relation to the criteria stated. Many of the vessels will undergo initial stabilisation prior to complete conservation and so will be in two or more categories.

Conservation Methodology 1: Stabilisation	Conservation Methodology 2: Preservation
SL Dolly 1850	SL Dolly 1850
TSSY Esperance 1869	SL Branksome 1896
SL Bat 1891	Yacht Margaret c. 1780
SL Kittiwake 1898	Hardman Dinghy c.1920
SL Water Viper 1907	Uffa Fox international sailing canoe c.1954
SL Swallow 1911	1898 motor boat
Ice Yacht late 19th/ early 20th century	White Lady 1930
Otto's tender, 19th century	Miss Windermere IV 1958
Hardman Dinghy c.1920	Cookie 1962
Yacht Dawn 1934	Shanida III 1980
Uffa Fox international sailing canoe c.1954	Chris Applebee 1984
MV Rigmaden c.1904	Trimite 1988
MV Lollipop 1923	Berthon boat c.1880-1900
MV Uncle Sam 1924	Beatrix Potter boat c.1890
MV Raae 1938	Brockbank's rowing boat c.1890
MV Pyewacket 1960	Duck Punt Anser C20th
SS Raven 1871	Clinker dinghy
Duck Punt Anser C20th	Tarn boat
Clinker dinghy	Canadian 4 man canoe
Tarn boat	Rob Roy canoe c.1870
Canadian 4 man canoe	Granta folding canoe
Single person canoe	Struer K4 Olympic canoe, 1955
Single person canoe	Struer K1 Olympic canoe, c.1960
Double canvas canoe	Wasdale Beck boat c.1224-1300
Granta folding canoe	Kentmere boat 1300-1320
Unknown hull	Yacht fragment 1745
Britannia roof light 1879	Britannia roof light 1879
Slingsby Falcon Glider, modified 1943	Slingsby Falcon Glider, modified 1943
Dolly, single cylinder engine	Sunderland float, 1939-45
Raven single cylinder vertical	Dolly, single cylinder engine,
Bat compound engine with Stephenson's valve gear, c. 1905	Raven single cylinder vertical engine
	Branksome compound engine
Otto triple expansion engine	Otto triple expansion engine
Lady Elizabeth single cylinder steam engine	Lady Elizabeth single cylinder steam engine
Raae 4 cylinder Grey Motor 1934	SL Dolly 1850
Pyewacket Two Volvo Penta engines	SL Branksome 1896
	Yacht Margaret c. 1780
	Hardman Dinghy c.1920
	Uffa Fox international sailing canoe c.1954
	1898 motor boat
	White Lady 1930
	Miss Windermere IV 1958
	Cookie 1962
	Shanida III 1980
	Chris Applebee 1984
	Trimite 1988

	Berthon boat c.1880-1900 Beatrix Potter boat c.1890 Brockbank's rowing boat c.1890 Duck Punt Anser C20th Clinker dinghy Tarn boat Canadian 4 man canoe Rob Roy canoe c.1870 Granta folding canoe Struer K4 Olympic canoe, 1955 Struer K1 Olympic canoe, c.1960 Wasdale Beck boat c.1224-1300 Kentmere boat 1300-1320 1745 yacht fragment 1745 Britannia roof light 1879 Slingsby Falcon Glider, modified 1943 Sunderland float, 1939-45 Dolly, single cylinder engine, Raven single cylinder vertical engine Branksome compound engine Otto triple expansion engine Lady Elizabeth single cylinder steam engine
Conservation Methodology 3: Restoration: Static	**Conservation Methodology 4: Restoration: Operational**
TSSY Esperance 1869 (steam engine no longer fitted) SL Lady Elizabeth 1895 SL Otto 1896 SL Kittiwake 1898 SL Water Viper 1907 (steam engine no longer fitted)	SL Osprey 1902 SL Swallow 1911 Yacht Dawn 1934 MV Penelope II 1930 Osprey compound engine, maker's no 591, Sisson of Gloucester, 1901 Kittiwake triple expansion engine, maker's no 611, Sisson of Gloucester, 1901 Swallow triple expansion engine, maker's no 1032, Sisson of Gloucester, 1911 Triple expansion marine engine, maker's no 794, Sisson of Gloucester, 1908 Penelope II BMC Navigator 4-cylinder, overhead valve petrol engine
Conservation Methodology 5: Adaptive Re-use	**Conservation Methodology 4: Deconstruction**
SS Raven, 1871	Sandbarge Elizabeth c.1830 Ferry Mary Anne, pre-1870

5.19 Access

The new Museum and site are designer to meet best practive for access as stated in the Stage D desing report, particularly the Access Report prepared by Jane Toplis Associate. The collection poses different challenges and we have focused on this at Stage D, with consultant involvement in design, interpretation and discussion of access to individual boats.

While it is our aspiration to make the museum visit fully accessible, it is also our duty to consider the impact of any adaptations on historic material, as referred to briefly in method statement 5, above. The lightly built Windermere launches do not have sufficient space to lend themselves to access for wheelchair users without substantial modifications. However, *Esperance* has been identified as having most potential for wheelchair user

access and this will be investigated further as part of detailed planning and in Stage E.

As a key National Historic Fleet vessel and of central importance to our interpretation themes, she will be one of the most evocative and significant exhibits in the Museum. Initial analysis suggests that wheelchair user access inside the cabin will not be possible (because of door width) without significant impact on original material. We will develop plans at Stage E to make the boat as accessible as possible through conservation management planning for this vessel, in line with the guidance in *Conserving Historic Vessels.*

Esperance will be undergoing conservation work as the museum opens and will be available for managed visitor access once that work is complete.

5.20 Management & Maintenance of the Collection

5.20.1 Collection Maintenance

The Trust has reviewed the management and maintenance requirements of the collection as part of the project development and this has informed the Conservation Management Plan and related information has been incorporated into the Business Plan.

The maintenance requirements for the collection are listed within the Action Plan in section 6 and are dependent on the conservation route taken for each individual vessel.

The creation of the slipway as part of the project will enable regular maintenance and monitoring of the vessels displayed and operating on the water and will be carried out by the conservation team. The team will comprise:

- Conservation Workshop Manager
- Conservation Assistant
- Conservation Engineer
- Conservation Apprentice

The team will also be supported by volunteers undertaking both woodwork and engineering roles and will be managed by the Volunteer & Training Coordinator.

The management and maintenance relating to the museum buildings and wider site are identified in the Management & Maintenance Plan appended to the Stage D Design Report with further detail in the business plan.

5.20.2 Management Standards

Accreditation
All of the Trust's venues are accredited museums and galleries and the Windermere Steamboat Museum is also currently applying for 'Working Towards Accreditation' status. The Trust will operate the Museum in line with Accreditation Standard policies which are implemented across the organisation.

All Windermere Steamboat Museum policies will follow the Accreditation Standard for:

- Operational health
- Collections
- Users and their experience

For collections management, we will maintain the following specific policies and plans:

- Collections development policy
- Emergency plan, regularly tested
- Care and conservation plan
- Documentation plan

Collections Development Policy
The Collections Development Policy was reviewed in 2012 with a view to supporting the development of the collection in line with aspirations for the Museum and its future permanent displays and temporary exhibitions.

The policy covers collections across the organisation, including the following sections on collecting areas of specific relevance to the Windermere Steamboat Museum:

Steamboats and Historic Vessels

- The Lakeland Arts trust will acquire a limited amount of material to build on and enhance the existing collection and to provide new and additional ways of interpreting the history and technology of boating on Windermere. The priorities will relate to the themes explored in the Windermere Steamboat Museum.
- New acquisitions may be made to fill gaps within the existing collection or in order to enhance the interpretation and understanding of an existing object within the collection.

Documentation Plan
The Trust holds both a Documentation Policy and a Documentation Procedural Manual to meet the Arts Council Accreditation standard. These procedures are implemented uniformly across the organisation's collections and will apply to the new Museum. The following documentation areas, as set out in the SPECTRUM (MDA/Collections Trust) standard, are addressed through the manual:

- Object Entry
- Accessioning
- Object Marking
- Security copy of accessions register
- Location and Movement Control
- Cataloguing
- Object Exit
- Loans Out
- Loans In

Some specific applications of documentation procedures are given in the conservation method statements. The Trust will shortly purchase a new collections management database which will operate across the organisation.

Emergency Plan
A revised prioritised and site-specific emergency plan for vessels afloat and ashore, small collections and collections in storage and conservation will be produced. This will reflect the specific requirements of the site and installation, means of salvage or protection ins-situ and salvage priorities. We will hold regular practices and familiarisation sessions for the staff team and local fire and rescue services. The plan will be reviewed after each practice. This is in line with general Trust procedure.

5.20.3 Training & Skills

The Lakeland Arts Trust will ensure it maintains heritage skills both within its core staff and through the volunteers participating in activities at the Museum. The Trust's Strategic Priority Four in the Strategic Plan 2012-14 is

- To achieve excellence by inspirational leadership and management and by building effective teams.

The Trust is committed to continuous professional development and the training of volunteers to strengthen the operation of the organisation. Training needs and opportunities for staff and volunteers have been assessed and identified, informed by the Training Plan by Lindsey Kennedy Smith.

The Museum will create well-planned and meaningful opportunities for people to gain new or increased skills through engagement with the collection of historic vessels. This may involve learning how to do something for the first time or build on existing skills. Opportunities offered will be both formal and informal to provide participants with knowledge and specialist skills to sustain heritage to the highest standards.

Training opportunities in heritage skills have been identified in the Activity Plan Action Plan and include partnerships with Kendal College and National Historic Ships to deliver accredited training placements and apprenticeships. In addition to this, opportunities to use the skills and facilities at the Museum will be used to provide opportunities for enthusiasts or other professionals to learn new or further develop heritage skills. Further information about training can be found in the Activity Plan.

5.20.4 Visitor Impact

The detailed business plan estimates that the Museum will receive 100,000 visitors per annum, and has sensitivity analysis on 70,000, 80,000, and 120,000. Participation and learning as outlined in the Activity Plan will be focused around the collection. The visitor experience and activities will be balanced with the management of the collection.

The risks associated with providing public access to the collection are:

- Through the operation of the vessels for passenger trips
- Potential damage from visitors touching delicate items
- Balancing a suitable environment and light levels for the collection with visitor comfort and experience.

The Museum will manage these risks by implementing the Conservation Management Plan balancing public access with collection conservation.

Conservation requirements for the various objects have informed the Interpretation Plan and Activity Plan for the Museum.

Annual maintenance and renewal of the interpretation has been budgeted for in the business plan with additional allowances made for programming and renewal at the higher visitor number scenarios. Within the business plan a curatorial team, learning officers and conservation team have all been identified and will be responsible for the management of the collection and enabling access.

5.20.5 Managing information

Decisions are based on evidence available from viewing the objects in the collection and from reviewing associated published and archival information. The majority of this material was organised when the Trust took over the Museum, and is available to staff and volunteers and to researchers by appointment. Further work is continuing to address a small documentation backlog and keep records up to date as new material comes in.

Library
There is currently an active initiative to rebuild the museum library. Work on book listing is ongoing and will shortly be made available to all staff and volunteers. The library will focus on an understanding of Windermere boats and their context. Priority collecting areas are as follows:

- Books and periodicals containing information on specific boats in the collection and the development of boating on Windermere; the development of marine engineering, the social history of the local area, other technological and social innovations relating to the collection and other related subjects.
- Publications or periodicals relating to maritime heritage and conservation including catalogues of maritime collections, auction catalogues containing artefacts relating to the collection and historic catalogues relating to late eighteenth, nineteenth and twentieth century marine equipment and fittings.

Some relevant material will be held at the Museum of Lakeland Life. We are aware of potential conflict with the collecting policies for libraries at:

- The Ruskin museum
- Barrow Dock Museum
- The National Maritime Museum, Falmouth
- The Riverside Museum, Glasgow
- The River and Rowing Museum, Henley
- The Armitt Museum

Our focus will be very much on Windermere boats and we will continue to make use of resources at other museums such as the NMM holdings in London and Falmouth.

Research and archive development
We are making active efforts to gather research material relevant to the collection, through newsletter appeals, volunteer research programmes, oral history events and direct contact with other organisations. The library development is complemented by an ongoing research programme, taking into account published information, written and oral sources, film, plans, drawings, and archival material.

New material is being listed and placed in correct storage conditions by the curatorial and conservation teams, with assistance from skilled volunteers.

Museum collections databases will be updated with relevant historic information.

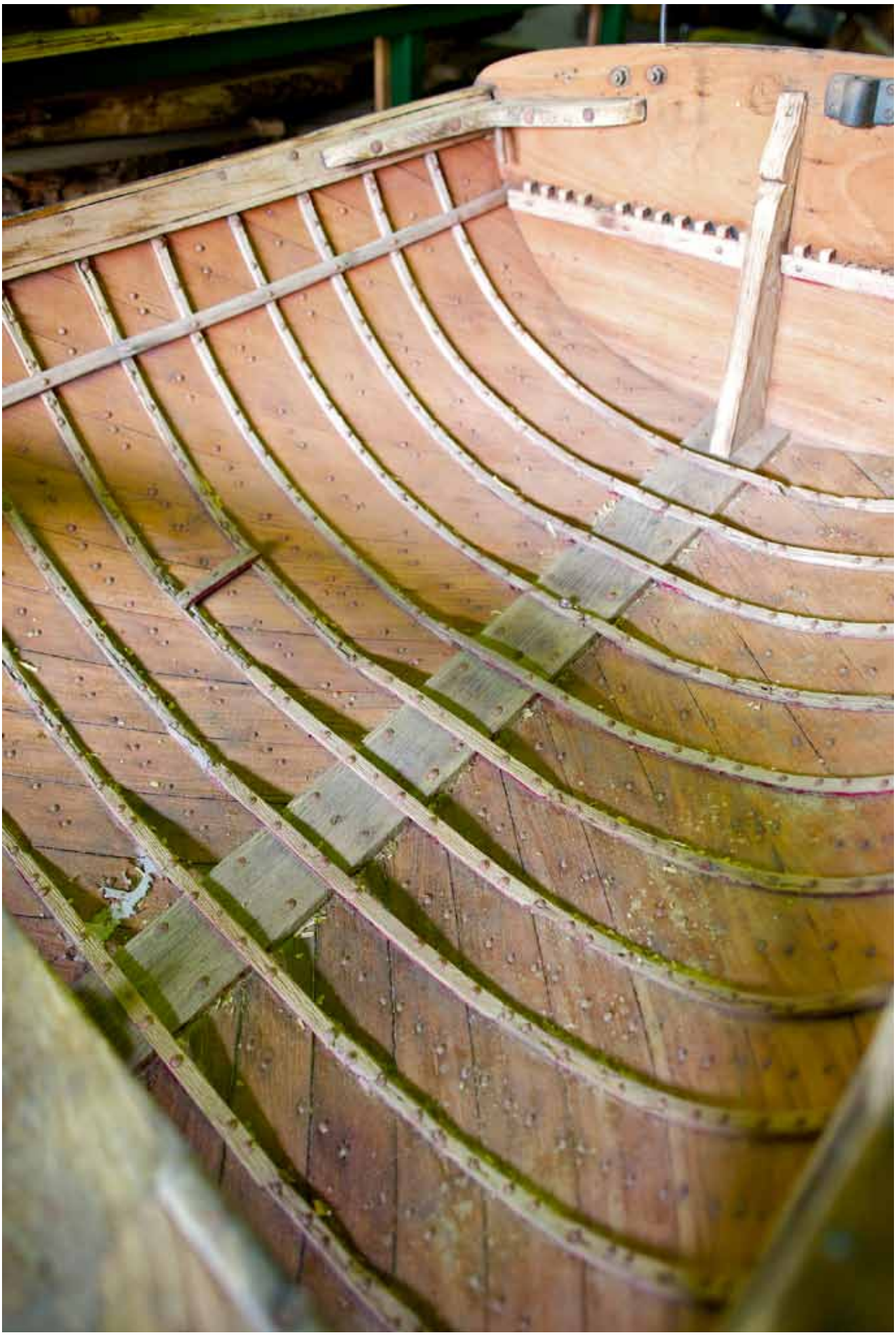
Sharing information
The community space, learning spaces and online resources will provide excellent opportunities for making research material more widely available and sharing information. We will work closely with special interest organisations such as the Steamboat Association and the Arthur Ransome Society in developing these resources.

A system of regular updates on new information and developments in research is in place for staff and volunteers and will develop further in the new museum. For example, regular volunteer research meetings are planned for 2013 and a volunteer research newsletter would provide a means of celebrating discoveries and sharing information.

There will also be a system in the new Museum for researchers to access information and see objects in store for research purposes, under curatorial supervision. Systems for enabling access to research

information without damaging the original will be developed.

An active programme of talks, articles, social media activity and links with other heritage organisations enable us to share information to mutual benefit. Engagement through formal and informal learning activities and volunteering will enable us to talk with broader audiences about how we are looking after our heritage.



Hardman Dinghy undergoing conservation © Lakeland Arts Trust