IALA LIGHTHOUSE CONSERVATION MANUAL

AISM-IALA : 20 ter rue Schnapper - 78100 Saint-Germain en Laye - France
Telephone: + 33 1 34 51 70 01 - fax: + 33 1 34 51 82 05
E-mail : iala-aism@wanadoo.fr - Internet: //www.iala-aism.org

Cover page - Castro Urdiales Lighthouse (Spain) Restoration Project

Foreword

Lighthouses, the Sentinels of the Sea, have inspired poetry, prose, paintings. These Lighthouses formed a global network for the safety of the mariner long before globalization. The lighthouse keepers have been romanticized in books and poetry such as 'The Lighthouse Keeper Wonders' by Edgar Guest.

'The light I have tended for 40 years
is now to be run by a set of gears…
…And I wonder now-will the grass stay green?
Will the brass stay bright and the windows clean?

IALA has its roots in the requirements and technology for lighthouses – indeed it is an organization that was born to serve the needs of lighthouse authorities. Although discussion on the possible formation of an association for heads of lighthouse and marking services began in 1926, the organization formally began taking shape in 1955, and the International Association of Lighthouse Authorities (IALA) was formally established on July 1st, 1957.

Through the years the emphasis on lighthouses and marking has changed. Modern technology provides effective and cost efficient means of guiding ships safely into ports through a smorgasbord of technologies – and IALA has adapted to provide guidance on these changes. Now known as the International Association of Marine Aids to Navigation and Lighthouse Authorities, IALA continues to provide a forum for information exchange, and a focus for harmonizing all aspects of marine aids to navigation.

In 1996 IALA established the Panel for the Preservation of Historic Lighthouses, Aids to Navigation and Related Equipment – the PHL. This panel met throughout the years, organizing a workshop in Kristiansand, Norway in May 2000 to look specifically at the challenges and options of preserving historic lighthouses by alternative use.

In 2002 the membership of the PHL was absorbed into the IALA Engineering, Environment and Preservation Committee (EEP) and continued its work. Through the years, the membership has recognized that the challenges in the conservation and maintenance of lighthouses are not limited to 'historic' lighthouses, but to all navigational structures.

The IALA Conservation Manual is the result of many years of work by the members of the PHL and later the working group of the EEP Committee. It sets out, in a workbook format, guidelines for the conservation and alternative use of historic lighthouses. I recommend the effort of the persons involved in developing this manual, as it is a tribute to the dedication and devotion of professionals, already very busy in their own organisations, to the conservation of these 'Maritime Icons' for future generations.

Finally, any comments or suggestions from the users of this manual would be very welcome for future editions. Please forward comments to: iala-aism@wanadoo.fr attention IALA Technical Coordination Manager.

Torsten Kruuse, IALA Secretary General
February 2006

Table of Contents

1. DEVELOPING A NATIONAL CONSERVATION PLAN

Historic Lighthouses are a unique part of the national heritage, to be treated differently from other assets, as they are a strong symbol of the World maritime heritage and hold great significance to local and national communities. As a consequence of the reduction in short range aids to navigation and the requirement to conserve historic lighthouses there is a need to find alternative uses for surplus property

Lighthouse Authorities have a duty to protect their historic lighthouses and by way of alternative uses, funds can be raised to finance their conservation. Alternative use should be adapted to the lighthouse and not the other way round. This point was a significant recommendation of the Preservation of Historic Lighthouses by Alternative Use Workshop held in Norway, May 2000.

The cultural heritage of lighthouses extends beyond the architectural value of the buildings, to the whole area of maritime traditions and history, including shipping trading patterns, navigational safety and wrecks; this needs to be explained and evidence documented for the benefit of future generations.

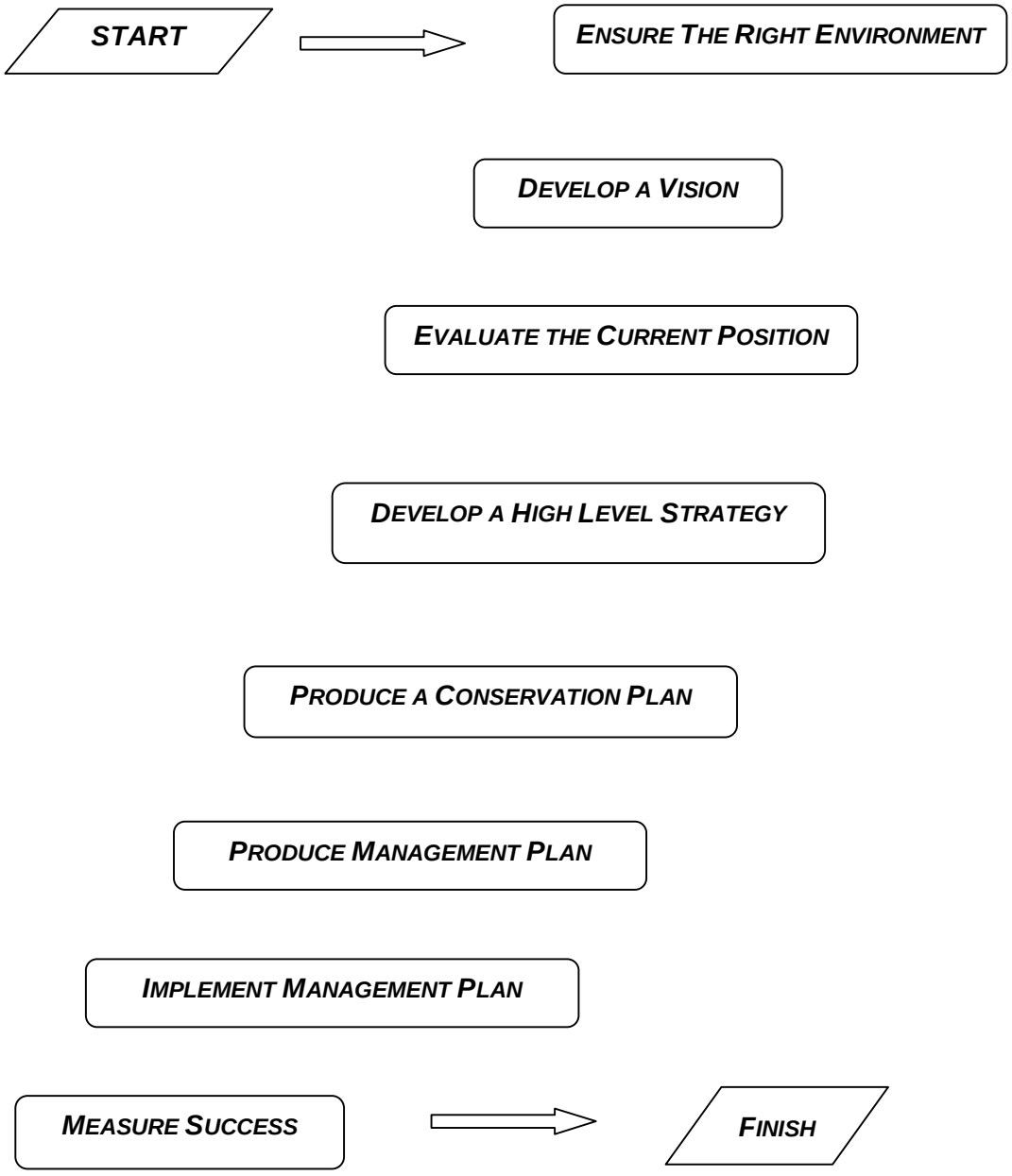
Recording present traditions and changes is also important, as they will become part of the cultural heritage for future generations.

The following chapter steers a path through the various stages of the preparation of a conservation plan, posing questions that need to be considered. It is not claimed to be an exhaustive list but coupled with the information contained in the complete manual, provides a good starting point.

This chapter is not only applicable to the preparation of a National Plan but can be equally applied to the preparation of any Conservation Plan.

Isle of May in the Forth Estuary, Scotland, is the site of the first recorded lighthouse in the country, in the background and the new light built by the Robert Stevenson in 1816 in the foreground. This was the first light in Scotland to be powered by electricity in 1886.

Developing a National Conservation Plan - Consider the following stages:



1.1 THE PLANNING PROCESS

1.1.1 Ensuring the right environment

- Consider political and public reaction from the International to local community level.
- Examine the scope and limitations of the existing legal and cultural frameworks and if necessary, consider any requirements for new legislation to provide flexibility.
- Gain a good understanding of the economic environment to assess whether any development will be sustainable in the longer term.
- Gain co-operation and support of heritage bodies.

1.1.2 Developing a vision

- Where applicable, keep aids to navigation operational.
- Promote tourism, raise public and cultural awareness and enhance education.
- Enable access and public enjoyment.
- Reflect cultural values.
- Encourage economic sustainability within the lighthouse estate.
- Develop an alternative revenue source.
- Protect the lighthouse heritage and conserve the surrounding landscape environment.
- Provide a repository for historic lighthouse equipment.

1.1.3 Evaluating the current position

- Determine what value the state places on its maritime, technical and industrial heritage.

Who are the stakeholders and what are their interests?

- What are your organisation's future plans with respect to the lighthouse properties and are they sustainable?
- Who are the organisation's stakeholders? (*see Annex A for examples*)
    - Political - international, national, regional and local community;
    - Social - Public Interest, heritage and environmental, special interests, employees, contractors and suppliers;
    - Economic - Taxpayers or service payers, fund managers/government departments, tourism bodies, local businesses.
- What are the stakeholders' interests?

  - Safe and expeditious navigation;
  - Provision of the aids to navigation service at the least cost;
  - Job satisfaction: new challenges for staff;
  - Heritage and environmental conservation;
  - Economic regeneration of local communities;
  - Education and public enjoyment.

A large tanker owned by one the major stakeholders in lighthouses in the UK and Ireland, passes Roches Point on the approaches to Cork Harbour. Through Light Dues the ship owners are very interested in the costs of running Aids to Navigation

- Are there any other external influences?
- Identify potential partnerships (including the need for external expertise), and the benefits.
- List the "enablers" and the "blockers".
  - Identify the strengths, weaknesses, opportunities and threats (SWOT analysis).
- Purposes of Public Access – to:
  - Interpret the Lighthouse/Maritime Cultural Heritage;
  - Enable the conservation of buildings and objects;
  - Educate, inform and raise awareness;
  - Provide supplementary income for conservation work.

1.1.4 Developing a high level strategy

Develop a strategy to achieve the vision and satisfy the stakeholders.

- Where does your organisation want to be in 3 to 5 year's time and beyond?
- Build a strategy to achieve the goals based on the strengths of your organisation.
- Evaluate the benefits of retaining ownership of historic lighthouses for alternative use over the longer-term, against any immediate gain from disposing of some or all of the property.
- Identify any scope for flexibility – is there a minimum requirement?
- Assess the impact on your organisation's resources and the possibility of inter-government agency or other co-operation.
- How will each of the stakeholders react?
- What are the options for funding?

1.1.5 Producing a conservation plan for historic lighthouses

- Evaluate the Lighthouse Estate:
  - initial "desk-top" evaluation and data gathering;
  - detailed profiling of properties;
  - ownership / rights of way;
  - buildings / environmental designations;
  - historical value;
  - operational and non-operational areas.

The conservation philosophy and the definition of an historic lighthouse is largely a matter for each nation depending on their political, cultural and social environment; each country will have its own policies, acts, traditions and culture.

- Develop criteria for classification within a conservation plan for each lighthouse in consultation with heritage bodies and others.
- Navigational significance; part of a tower or current AtoN systems:
  - Maritime cultural history.
  - Present and previous use; operational aid to navigation?
  - Is the lighthouse station a single entity including buildings, equipment etc?
  - Artefacts, antennae, gardens etc.
  - Community relationship : human factors - way of life.
  - Architectural significance and type of construction.
  - Authenticity.
  - Accessibility.
  - Vulnerability.
  - How representative is it of the country's lighthouse heritage (e.g. age).
  - Function (e.g. coastal, fairway, harbour), use, materials and style.
  - International / regional importance.
  - Symbol of technological advancement.
  - Physical condition.
  - Landscape setting.
  - Flora and fauna, marine wildlife.
  - Geology/ecology.

This is not an exhaustive list.

- Record the significance and vulnerability of the Lighthouse stations to be preserved:
  - Survey the sites.
  - Develop conservation statements.
  - Agree conservation policies: keep the estate intact; avoid part disposals; examine alternative use; enable public access and enjoyment.

  - Review heritage and environmental regulations.
- Identify whether an environmental impact assessment and "clean-up" operation may be necessary.
- Assess priorities in terms of heritage significance and the potential for public access to a given site.

1.1.6 Producing a management plan for the conservation of historic lighthouses

- Decide how to maintain the significance of the station and resolve any conflicts.
- Incorporate alternatives for surplus properties where applicable:
  - Balance opportunities against risks and liabilities.
  - Identify opportunities for leisure, education and partnerships.

The management plan should become part of the normal management processes of your organisation.

- Evaluate options for additional tasks for Light keepers:
  - Lighthouse tours.
  - Management of other aids to navigation in the area.
  - Wardens for parks or bird sanctuaries.
  - Weather observation.
- Clarify responsibilities (including obligations in respect of registered or listed buildings):
  - Lighthouse Authorities as owners are responsible for conserving the buildings and/or administering the plan.
  - Heritage bodies set down the conservation framework and ensure some standards are maintained.
- Ensure all other impacted organisations concur with you management framework to ensure consistency.
- Develop sustainable solutions:
  - Business Plan for Commercial Revenue.
  - Legal framework.
  - Analysis of opportunities and threats.
  - Financial plan (including grant applications).
  - Marketing plan.
  - Partnerships.
  - Organisational structure.
  - Public finance, non-commercial.
  - Enable public access and enjoyment.

- Any income used for conservation.
- Controlled disposal.
- Lease surplus estate to responsible bodies.
- Reserve rights of access.
- Ensure property maintained and conserved.
- Grant aided only.
- Enable public access and enjoyment.
- Grant monies and other income used for conservation.
- Confirm any conditions attached to grant.
- Temporary Closure (Mothballing).
- Temporary solution.
- Minimal maintenance to prevent deterioration.
- Outright disposal.
- Sell or lease to responsible body.
- Keep station intact as a single entity if possible with responsibilities written into the deeds.

- Produce timetable with critical path milestones.

1.2 IMPLEMENTATION OF MANAGEMENT PLAN

1.2.1 Identifying the potential and limitations of the station

This section gives guideance on practical tools for public access.

- Length of the visitor season.
- Weekly/daily opening periods (conflicts with local residents / adjacent occupiers).
- Size of accommodation.
- Need for interpretative display panels - cooperation among interested parties.
- Energy sources / requirements.
- Access - car parking, boat landings, foot and air.
- Toilets, first aid and rest room facilities.
- Security and fire prevention.
- Sale of merchandise.
- Resources available for guided tours.
- Training requirements for personnel.
- Vulnerability to damage of the buildings and the environment.
- Visitor potential (market survey).
- Determine visitor flow plan for the premises.

Refer to other chapters for additional information.

1.2.2 Risk assessment

- Appropriate resources to accommodate anticipated number of visitors.
- Health and safety.
- Environmental impact.
- Need for directional and cautionary notices.
- Assess legal liability.
- Assess insurance requirements.

1.2.3 Legal agreements with partners

- Transfer of liabilities.
- Reserve rights of access.
- Ensure non-interference with aids to navigation functions.
- Permit public access for education and enjoyment.
- Decide whether it is a profit or non-profit venture.
- Provide for the apportionment of revenue income and costs.
- Provide for agreement of visitor entrance charges.
- Impose an obligation to comply with any conservation requirements.
- Transfer responsibility to local level for complying with legislation in respect of catering, cinema (video films), disability discrimination and social inclusion.
- Clarify intellectual property (trademarks, copyright etc) ownership.
- Specify accounting arrangements including ticketing.
- Reversion Clause.

1.2.4 Publicity and educational material

- Produce marketing plan.
- Design and distribute marketing leaflets / posters.
- Establish audio / visual interpretation.
- Provide brochure on history of the lighthouse and present day operations.
- Arrange media coverage.
- Displays, exhibitions and information.
- Education and support – materials.
- Databases, enquiries and publications.
- Scholarships and research.
- Special interest and corporate hospitality.

1.2.5 Transportation

- Consider bus routes or special access arrangements.
- Arrange access by boat to island / offshore stations.

This exhibit of a cross-section of Fastnet Lighthouse is on display at Mizen Head Visitor Centre, Ireland. It is part of an exhibition, which shows the history, and construction of the famous offshore light, approximately 8.9nm south east of Mizen Head.

1.3 POINTERS TO

This section sets out the key issues and stages that need to be followed if the project is to be a success. It also indicates where support and involvement of outside bodies will be needed during the development phase.

SUCCESS

- Develop a strategy.
- Evaluate the potential.
- Analyse conservation needs.
- Ensure alternative uses are workable within the aims of conservation.
- Work in partnership.
- Implement the plan in phases.
- Work with experts in the relevant fields.
- Satisfy all the stakeholders.
- Communicate effectively.
- Seek sponsorships and grants.
- Risk Analysis.

Landing Stores and lightkeeper relief's in early 1900's Flannan Isles, Scotland. Modern Health and Safety legislation can have a great impact on allowing public access in boats, on steps and jetties.

1.4 MEASUREMENT OF SUCCESS

1.4.1 Monitoring and Review

- Produce benchmarks for measuring success.
- Provide actual examples of alternative use.
- Periodically review strategy, plans and procedures and adapt to the changing environment.

1.4.2 How your organisation may measure success

- Lighthouse Authority
    - Self supporting - even partially.
    - Revenue generation for re-investment in conservation.
    - Reduction in maintenance costs.
    - Increase in number of stations actively involved in alternative use.
    - Increase (or stabilise) number of visitors - access and enjoyment factors.
    - Increased political awareness with economic benefits.
    - Formation of strategic alliances - including inter-departmental service level agreements - through partnerships, which have helped to achieve conservation goals.
    - Co-operation among military and civil administrations regarding the "common maritime inheritance".
- Conservation Authorities
    - Met conservation standards and managed visitor access to contain numbers where appropriate (each country will have its own conservation standards).
    - Created a shared understanding of cultural heritage values - measured through special visitor surveys and media response.
- Local Community
    - Job creation and economic regeneration.
    - Strengthened community spirit and increased local identity.
    - "Put them on the map" in a positive way!
    - Increased understanding following a sharing of values among the community.
    - Number of schools visits increased to prove the attraction as a valuable educational resource.
    - Greater awareness of cultural and environmental responsibilities - children can influence society and change a generation's attitudes.

- Tourism
    - Job creation and economic regeneration
    - Improved variety and quality of visitor attractions in the area
    - Extension of visitor season
    - Customer satisfaction guaranteed!

1.5 ANNEX A – STAKEHOLDERS

(Those bodies with a potential interest in historic lighthouses)

International

- IALA
- International Council on Monuments and Sites (ICOMOS) advise UNESCO on cultural World Heritage sites.
- The International Committee on the Industrial Heritage (TICCIH) advise ICOMOS.
- Lobby groups : Friends of the Earth / Greenpeace / World Wildlife Fund.
- Tourism networks that reach across national boundaries.
- Lighthouse Societies throughout the world.
- International Tourism Association.

National

- Government Departments/Agencies.
- Aids to Navigation Authority.
- Environmental Management Department.
- Cultural Heritage Department.
- Maritime Transport Department.
- Ministries of Tourism / Trade / Economic Development.
- Ports Department.
- Fisheries Department.
- National Trail Networks.
- Employees, contractors and suppliers.
- Lifesaving organisations.
- Housing Associations.
- Meteorological organisations.

Provincial, State, District

- Ports & Harbours.
- User Groups – Leisure, Fishing, Commercial Shipowners / Pilots.
- Regional Trail Networks.

- Local Government/Councils – Tourism/Heritage/Museum Services.
- Local Government: Planning Authority (often has heritage responsibilities).

Municipalities

- Ports & Harbours.
- User Groups.
- Coastal Cultural Groups.
- Diving Clubs.
- Conservation Interest Groups ("Friends" and Historical Societies).
- Environmental Groups.
- Local Government/Councils – Tourism/Heritage/Museum Service).
- Local Government: Planning Authority (often has heritage responsibilities).
- Local Trusts and Community Groups.
- Bodies' involved in particular heritage conservation projects (e.g. Nordic countries).

The Pater Noster project was presented at the IALA Seminar on Lighthouse Preservation held in Gothenburg in August 2005. The principal reason that the project has progressed to date is the involvement of many sources of funding and bodies who have contributed to it e.g. Bohusläns Museum, Pharmadule Emtunga, Alucrom AB, Tjörns Commune, International Paints and The Swedish Maritime Authourity (Sjöfartsverket)

1.6 ANNEX B - CHECK LIST

This provides a list of the various stages that must be addressed in preparation of a National Conservation Plan. It provides a record of those that are applicable to the project and can be used to plot the progress through the various stages.

Items to be considered	Is Item Applicable? Yes/No	Comment
Planning Process		
Ensure right environment		
Develop vision		
Evaluate present position		
Develop high level strategy		
Produce a conservation plan		
Produce a management plan		
Implement Management Plan		
Identify potentials and limitations		
Carry out risk assessment		
Complete legal agreement with partners		
Produce publicity and educational materials		
Review transportation		
Identify the Pointers to Success		
Monitor and Review Success		
For lighthouse authority		
For conservation authority		
For local community		
For tourism		

2. THE LEGAL ISSUES OF ALTERNATIVE USE

Alternative use may provide a major opportunity to help ensure the conservation of historic lighthouses. However, the opportunity needs to be balanced against the risk, taking into account legal and financial considerations. This includes checking that the lighthouse authority or other body has the necessary legal powers to undertake alternative use activities alongside its normal activities for the provision of marine aids to navigation. The relevant legal issues generally fall into one of four distinct areas:

- Constitutional – the organisation's legal status and powers.
- Contractual - regarding ownership, title and access rights in respect of the properties.
- Duty of care to people, property and the environment.
- Compliance with public laws and codes of practice, including environmental and heritage designations and planning consents.

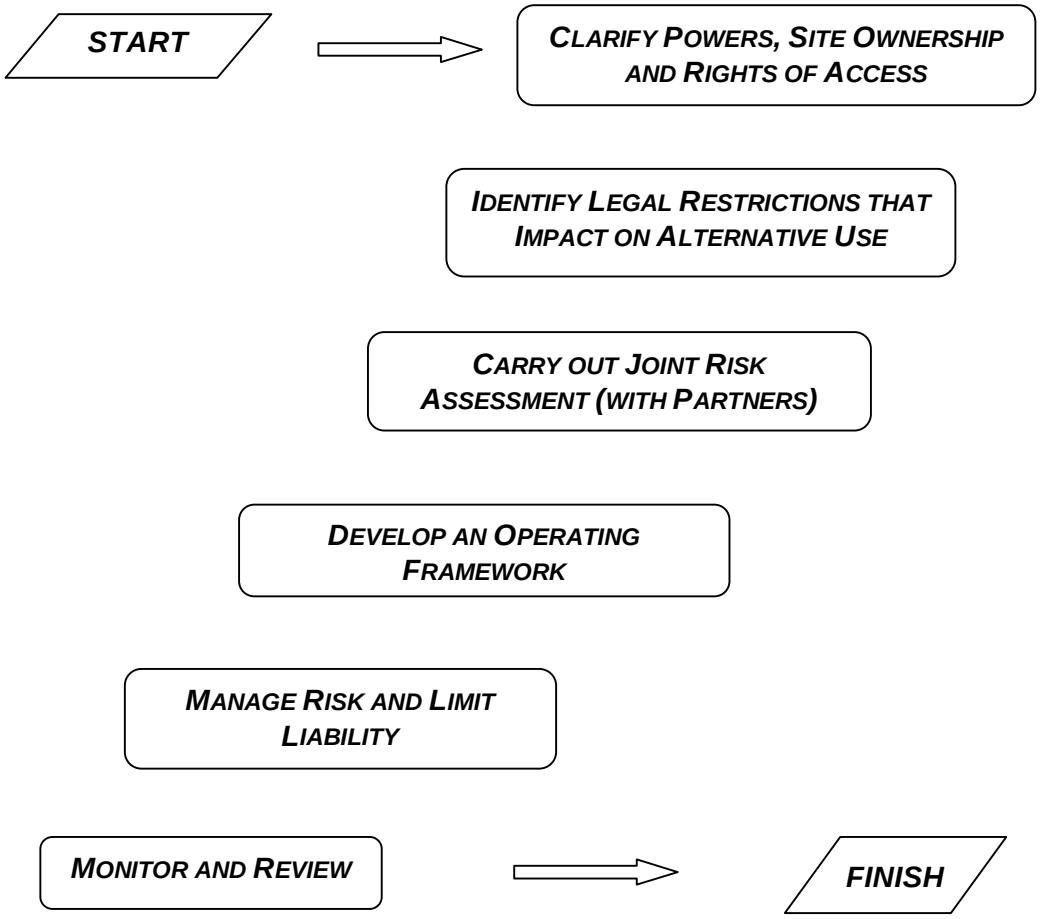
These are dealt with in sequence in the sections that follow, to show how the risks can be managed once a property has been identified as having potential for alternative use. However, it is important to keep in mind the wider aims of the lighthouse authority or heritage body, which may be to:

- *Conserve the properties (and associated equipment) as:*
  - *a platform for the effective operation of aids to navigation requirements.*
  - *historic structures of national or local importance.*
  - *A natural and distinct feature of the landscape environment.*
- *Reduce costs by adopting a wider scheme for effective management of the station, including measures for the transfer of certain risks and liabilities and the development of suitable schemes for revenue generation.*
- *Enable safe access for public enjoyment and education.*

To a greater or lesser extent, an understanding of the legal issues is required to enable appropriate safeguards to be established for the achievement of these aims. The purpose of this chapter therefore is to provide outline guidance to the main areas of risk, responsibility and liability and to the steps that can be taken to reduce exposure to liabilities.

PROFESSIONAL ADVICE SHOULD ALWAYS BE SOUGHT TO VALIDATE ANY ASSUMPTIONS MADE

The Legal Issues of Alternative Use – Consider the following stages :



2.1 CLARIFY POWERS SITE OWNERSHIP AND RIGHTS OF ACCESS

2.1.1 Organisational Powers, Rights and Duties

Any organisation thinking about implementing schemes for the alternative use of historic lighthouses should consider carefully their foundation and purpose, scope of responsibility and the relevant legal jurisdiction in which they operate. The functions of a public body may be quite limited and it may face serious consequences if found acting outside its powers. However, partnerships between public departments - such as lighthouse authorities and heritage bodies – may produce a sound legal basis on which to proceed without the risk of being challenged.

Most public organisations have a constitution, usually laid down in the public law or governmental policy of the relevant state, defining their purpose and how their activities and resources will be financed. International charters or conventions may also have a bearing on what activities should be carried out by the relevant public departments of a signatory state. Other sources clarifying the scope of activity of the relevant authority may include, for example:

- Statements of strategy, policy, procedure or good practice.
- Custom and practice over time.
- Common law precedents.
- Service level agreements.

International charters or conventions on relevant heritage issues place clear obligations on signatory states e.g. Venice Charter 1964, European Charter of the Architectural Heritage 1975, Declaration of ICOMOS – Stockholm 1998, International Cultural Tourism Charter, ICOMOS, Mexico 1999.

Even if an organisation has the necessary powers, a lack of resources - human (including the right skills) and financial - may limit its capability to deliver sustainable solutions. Such factors should always be taken into account in deciding the best course of action.

Is alternative use within the scope of the lighthouse authority's powers
***AND** is it something they can do alone?*
***OR** through a third party – by disposal or leasing?*
***OR** by cooperation between Government Departments?*

2.1.2 Site ownership and rights of access

Establish the ownership of the lighthouse property and clarify existing legal obligations associated with ownership, such as:

- rights of access including those acquired by use over time;
- restrictive covenants;
- rights of re-purchase in favour of any former owner;
- existing use by third parties e.g. leases, licences, access for services.

2.1.3 Rights of third parties

Are there any local residents likely to object to wider use of the lighthouse property – particularly if it affects their outlook or privacy?

Check the ownership of adjoining land and clarify any rights of shared access. Ensure that neighbouring landowners will not be adversely affected by any alternative use of the lighthouse property. Consult with all those who may have an interest in the property or its future development as early as possible in the process.

2.2 IDENTIFY LEGAL RESTRICTIONS THAT IMPACT ON ALTERNATIVE USE

2.2.1 Public Laws

A lighthouse authority's powers, duties and rights may be modified by the general public laws of the relevant country, province or municipality:

- Health and safety (see Chapter 4 on Making a Lighthouse Visit Safer).
- Regulations e.g. planning (including heritage) and building, disability discrimination.
- Environmental duties e.g. pollution cleansing, noise reduction, waste disposal and discharge.
- Consents e.g. catering, retailing and cinema.

The effect of these public laws should be established when developing an outline scheme for alternative use. The scheme should be modified, as appropriate, and the necessary consents applied for before commencing implementation. Consultation with heritage bodies and planning consents for changes to historic lighthouses are especially important to ensure that the scheme is adapted to the lighthouse rather than being driven solely by commercial considerations. Particular attention should be given to the possible constraints listed in the paragraphs below.

2.2.1.1 Planning regulations

Planning and building regulations may apply to schemes for alternative use of lighthouse stations in the following areas:

- Alterations to, or change of use of, the property.
- Transport infrastructure including highways, footpaths and parking.
- Building construction standards.

Failure to obtain the necessary consents could lead to fines or enforcement orders and consequent interruption, or even termination, of the venture.

2.2.1.2 Heritage conservation

Lighthouse authorities have duties in respect of stations included on registers of buildings listed as having historic or architectural significance. It may not be immediately apparent from the registration entry, as opposed to the closer scrutiny of the regulations that similar rules could apply to adjacent buildings within the area of the main lighthouse. If an application for a heritage grant is being considered then check the conditions laid down by the authorities offering grants, as there may be a liability to pay back a significant proportion of the money granted if the venture fails or the property is disposed of in the future.

2.2.1.3 Safety

Apart from general health and safety requirements, which should be clarified, the remoteness of the station from the nearest community and public services may be a major factor in deciding whether to proceed with alternative use. For example, the provision of hot and cold running water, toilets and related drainage and first aid facilities might be a legal requirement for any visitor attraction.

2.2.1.4 Environmental

International concerns about the environment have led to provisions in the public laws of many countries. As a result, organisations, landowners and others have a clear duty to adopt a cleaner and more caring approach and take remedial action for any previous harm done. In particular, lighthouse authorities, in carrying out their normal operations and any alternative use, may be forced to consider:

Inishtearaght Lighthouse, Ireland converted to solar power, which is environmentally friendly. This does not encourage public access due to the very limited non-essential power for lighting and heating for building conditioning.

- Noise reduction from fog signals and generators.
- Avoidance or clean-up of substance pollution.
- Removal of hazardous materials e.g. asbestos.
- Reductions in gas emissions from generators.
- Use of alternative energy sources.
- Provision or improvement of foul drainage treatment.

In addition, many lighthouses are within protected areas designated as national parks, sites of special scientific interest, heritage coast, special areas of conservation, or otherwise. These may impose restrictions on the use of buildings and access to the site, due to potential damage to flora, fauna and wildlife.

2.2.1.5 National security

Laws or policies on national security may restrict any use of, or access to, the station to activities compatible with national security requirements.

2.2.1.6 Intellectual property

Trademarks, copyright and patents can be valuable property. A lighthouse authority needs to protect any such property that it can rightfully claim ownership to, as far as possible. Equally, measures need to be adopted to ensure that the rights of any other party are not infringed when using images, brands, printed works, computer software and designs.

2.2.2 Private legal relationships

Careful consideration will need to be given to the effect on any existing agreements permitting multi-use or occupation of the station e.g. weather reporting, coast lookouts, bird watching. In addition, third party rights of access to services for repair and maintenance will need to be kept in mind.

2.2.3 Interference with aids to navigation

Any wider use of the station may be limited, to some extent, by the need to prevent any interference to the operation of the aids to navigation e.g. obstruction of the light, interference with radio signals. Careful thought also needs to be given to the possible impact on the normal activities on station such as maintenance and helicopter operations.

A property register or manual is a useful tool – containing details of the aids to navigation and any operational, heritage or environmental restrictions, as well as ownership, rights of way etc.

2.3 CARRY OUT A JOINT RISK ASSESSMENT

2.3.1 Risk assessment

A joint risk assessment with any partners in the venture will help to identify the key risks and enable proper controls to be established. This should include an evaluation of the skills, experience and level of investment that each of the parties will bring to the venture and the overall suitability of each of the partners for the venture.

An example of a simple risk assessment procedure appears at Annex B.

For property disposals or major works, a more complex environmental assessment may be required with solutions to remedy any problems identified. This is likely to involve consultation with all the relevant stakeholders and will almost certainly cause delays in the timetable for implementation of the scheme.

2.3.2 Liabilities

2.3.2.1 Criminal

Criminal liability may result in a fine for an organisation, or even a custodial sentence for an individual belonging to the organisation, if found guilty of an offence e.g. inadequate health and safety standards or environmental pollution.

What are the consequences of failing to protect visitors, or causing damage to, or loss of, property?

2.3.2.2 Civil

The civil courts will normally award damages for any organisation or person found to have failed in their duty of care to people or property, or for copyright infringement etc. This could mean a large financial loss for one or more of the venture partners.

2.3.3 Opportunities and threats

In the final analysis, the venture partners will need to balance the opportunity against the potential liabilities and how effectively the risks can be managed, based on the laws of the relevant country or region.

2.4 DEVELOP AN OPERATING FRAMEWORK

2.4.1 Non-legal documentary systems

The production of relevant policies, procedures and work instructions will be advisable to provide a suitable operating framework. This includes details about the ownership of the lighthouse property and the key factors that will have an impact on alternative use.

2.4.2 Produce legal agreements

Identify the parties, clarify each of their roles and set out the main *heads of agreement*, in the first place.

Then decide what types of agreements are needed:

- lease - including rights of access;
- licence;
- franchise;
- retailing.

The following list contains some pointers to forming a workable agreement:

- Set out the main purpose of the agreement and its duration;
- Identify the parties and clarify their roles, responsibilities, liabilities and duties;
- Reserve rights of access for maintenance of aids to navigation, if appropriate;
- Manage and control visitor access including pricing policy and numbers;
- Clarify financial provisions and accounting responsibilities;
- Protect intellectual property;
- Protect the interests of other users of the site;
- Limit the nuisance to adjoining landowners;
- Establish processes for supervising the scheme with contact names;
- Establish the process for dealing with disputes.

Make sure that the final written agreement covers all the main areas and replaces any previous verbal or written undertakings, otherwise misunderstandings and disputes may arise at a later date.

2.5 MANAGE RISKS AND LIMIT LIABILITY

2.5.1 Risk management

Adopting the principles of risk management will help to safeguard the lighthouse authority and venture partners from exposure to liabilities and the consequential costs:

- risk assessment;
- loss control;
- insurance and self-insurance;
- contractual indemnities;

The lightkeeper at Cap Frehel Lighthouse, Brittany, France has been retained despite the automatic status of the light. His training and experience makes him invaluable as a guide, not only for his knowledge but for his appreciation of the Health and Safety on site.

- people training and development;
- professional advice where appropriate.

2.5.2 Sharing the risk

Having identified the major risks associated with the scheme, steps should be taken to minimise exposure to potential liabilities. As a general rule, the risks should be shared among the partners in proportion to their roles and responsibilities and their share in the proceeds from the venture.

2.5.3 Standards

Apply recognised standards and good practice to the venture e.g. quality assurance, health and safety. Ensure the recruitment and development of people with the right skills and experience to operate the venture.

2.5.4 Risk transfer measures

Negotiate contractual indemnities backed-up by commercial insurance cover, where appropriate, to protect the lighthouse authority. Maintain insurances at the correct level.

2.5.5 Communication

Good communication among named contacts representing each of the parties can significantly reduce risk and help the venture to run smoothly and minimise the input of human resources by the lighthouse authority.

2.6 MONITOR, REVIEW AND AMEND AS REQUIRED

2.6.1 Site inspections

Periodic site inspections should be carried out jointly with the partners, each represented by competent personnel, to:

- ensure protection of the aids to navigation equipment;
- monitor safety measures;
- secure environmental management;
- discuss and resolve any problem areas;
- check compliance with heritage laws;
- agree on improvements to the scheme.

A group of international visitors are shown round Punta de la Silla Lighthouse, San Vicente de la Barquera, Spain to offer advice on the provision of public access and café facilities based on their experiences on their own projects.

2.6.2 Visitor surveys

Gain feedback from visitors as a useful measure of whether the scheme is providing value for money and operating efficiently.

A typical example of a visitor survey form appears at Annex C.

2.6.3 Review the plan

Review the business plan with the partners if circumstances have changed significantly. The venture may be influenced by external factors or a major re-structuring exercise within one or more of the organisations involved. Modify legal agreements as necessary.

2.6.4 Enforce legal agreements

If a significant dispute arises that cannot be resolved by discussion among the parties, it may be necessary to resort to arbitration or the law to resolve the issue – particularly if the property is vulnerable to damage or decay.

2.6.5 Communication

Maintain consultation with local authorities and other stakeholders with an interest in the venture. Tourism bodies and the local press can be useful marketing agents.

2.7 ANNEX A - CHECKLIST

The following provides an aid to check that all points have been considered.

Items that should be considered	Is Item Applicable? Yes/No	Comments
Powers		
Ensure that you and your partners have the necessary powers		
Do you have the resources?		
Consider strategic partnerships		
Site ownership and rights of access		
Clarify basis of occupation and access to the site		
Confirm rights or concerns of any other parties and consult with them		
Identify legal restrictions		
Consider planning implications and heritage conservation requirements		
Evaluate safety and environmental requirements		
Consider national security needs		
Protect intellectual property		
Safeguard the rights of existing occupiers		
Protect against interference to the effective operation and maintenance of the aids to navigation		
Carry out a joint risk assessment		
Identify the major risks		
Assess potential liability		
Balance the opportunity with the threats to the organisation		
Develop an operating framework		
Produce policies and procedures		

Items that should be considered	Is Item Applicable? Yes/No	Comments
Negotiate legal agreements		
Manage risks and limit liability		
Share the risk		
Adopt clear standards and best practice		
Use risk transfer measures such as commercial insurance		
Maintain communication		
Monitor, review and amend		
Carry out periodic site inspections		
Invite visitor feedback		
Review the business planning assumptions		
Enforce legal agreements		
Maintain communication		

2.8 ANNEX B

Risk Assessment Report

Date

Station

Place

PHOTO OF STATION TO BE INSERTED

AUTHOR

Assessment details:

Assessor:			
Assessment Date:		**Review Date:**	
Initial Risk Level:		**Residual Risk:**	
Job Number:		**Process:**	
Process Cat:			

Hazards & Controls

Hazard:	
Control Measure:	
Hazard:	
Control Measure:	
Hazard:	
Control Measure:	
Hazard:	
Control Measure:	
Hazard:	
Control Measure:	

Signed:	
Date:	
Assessment Details:	

2.9 ANNEX C

Name of Organisation Conducting Tour

We hope you enjoyed your visit to our Lighthouse Visitor Centre. We would be grateful if you could take a few moments to answer the following questions.

Lighthouse Visited ..... Date .....

Party Size : Adults ☐ **Children** ☐ **Pensioners** ☐

What was the main reason for your visit today?	**How did you learn about the Lighthouse Visitor Centre?**	**How would you rate the performance of your tour guide?**
o Lighthouse enthusiast	o From a relative / friend	o Poor
o An interest in historic buildings	o Advertising leaflet	o Acceptable
o Educational visit	o Tourist Information Centre	o Good
o It was recommended by a relative/friend	o Resort Guide	o Very Good
o Somewhere to take the children	o Internet	**How would you rate your visit in terms of value for money?**
o The weather	o Brown Information Signs	o Poor
o In the area and it was something to do	o Other (please specify)	o Acceptable
o Other (please specify) ……	……	o Good
		o Very Good

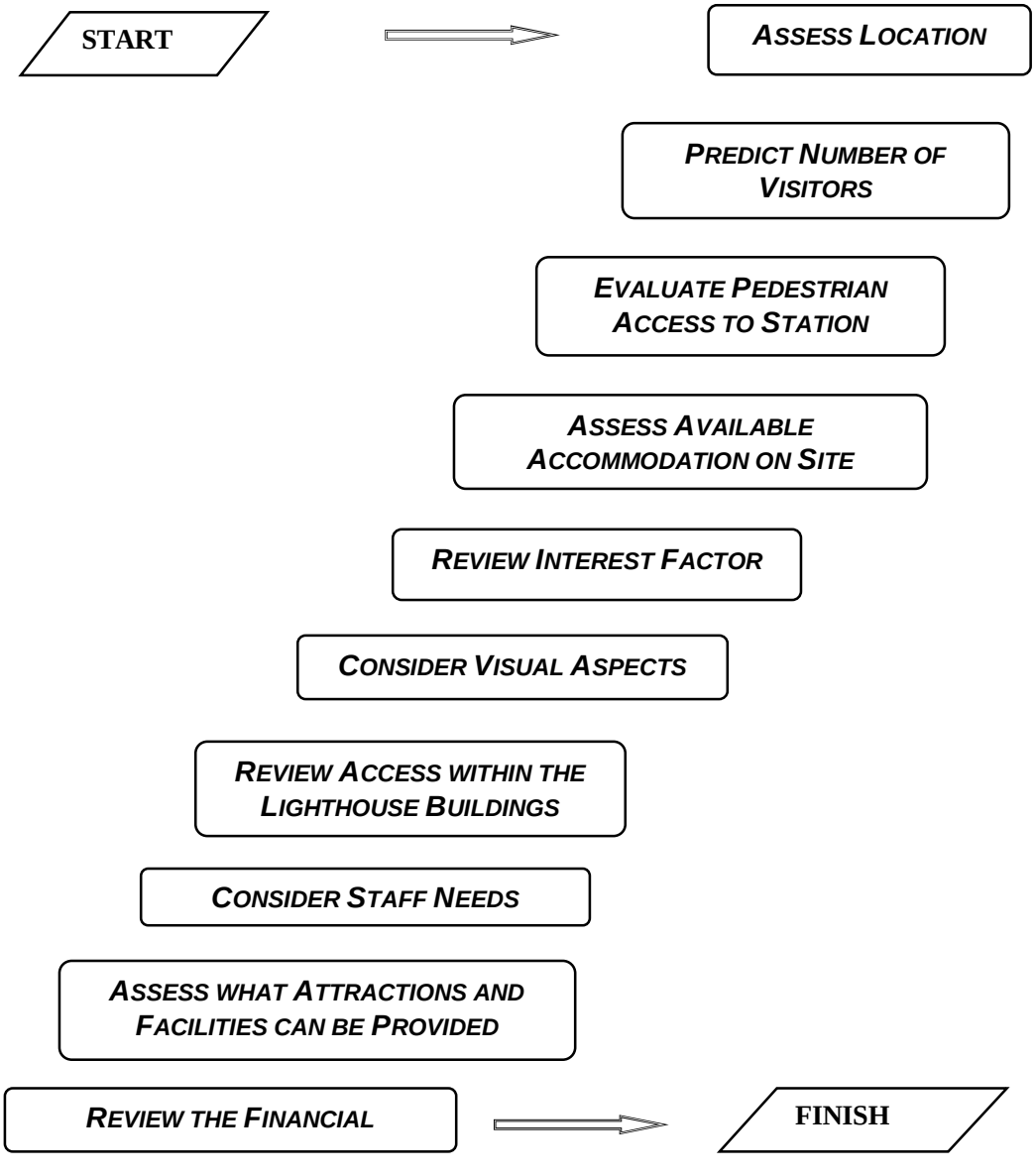
Comment (Please suggest how we could improve our Lighthouse Visitor Centre)

3. HOW TO SELECT WHICH LIGHTHOUSES TO OPEN

This chapter is included to assist those needing to make a decision as to which lighthouses are most suitable to open to the public. It is assumed that there is a wish to maximise the number of visitors in order to maximise revenue and offset the initial expenditure of setting up the venture.

However, in some cases there may be a wish to limit the numbers of visitors in order to protect the lighthouse, the environment or reduce the level of interference to the wildlife.

How to select which lighthouse to open – Consider the following::



3.1 LOCATION

3.1.1 Does the site have good road access?

The width and type of access road needs to be considered in relation to the type and size of vehicles that can use it. This will directly affect the number of persons reaching the site, particularly if there is, or can be, bus access.

Access and facilities for disabled persons must be considered and all reasonable measures should be taken

3.1.2 Can vehicles actually reach the station?

This is particularly important when considering the initial setting up of the station and the ongoing running of the venture.

Mull of Kintyre Lighthouse, Scotland is at the end of an *extremely twisting single track road which makes public access very difficult and very limited space is available for parking within several miles of the site.*

It will also have a significant effect on the sites' suitability for disabled access.

3.1.3 Can adequate car parking be provided?

It is vital to be able to provide adequate car parking for the site. It may be necessary to buy or lease land from the adjacent landowner. The parking site should be suitably close to the lighthouse with safe access on foot. Only a very big venture would warrant a park and ride scheme.

The effect on local residents and landowners must be considered when setting up a venture of this nature. Car parking can be a contentious subject, along with traffic congestion and a heavier use of the road network. Private roads need to be considered carefully due to the costs of their extra maintenance.

3.1.4 Does the compound area have free or restricted access?

Is the lighthouse site shared with other parties and as a result, will access be restricted? Such a situation may significantly restrict the free access of visitors to the site and prevent its full exploitation. Is the ecology of the site so important that visitors would have an adverse effect, or must their movement be restricted to minimise damage or disruption to wildlife? A balance has to be struck

3.1.5 Is the lighthouse accessible by sea?

If a station is only accessible by sea then it will be necessary to review how sheltered and safe the landing is to use. Is the path up from the landing stage safe for visitors to negotiate? If the station is on an island reached by ferry, then the regularity of the service needs to be considered along with the fare being charged.

This should not be considered as a disadvantage as it may enhance the attraction of a visit to the lighthouse!

3.1.6 Are there any seasonal influences that will affect access?

Weather, particularly wind, may affect the access to the site making it very unpleasant or even dangerous, particularly above cliffs. Other conditions, such as bird breeding seasons, could require access by visitors to be restricted at certain times of the year.

Puffins and Guillemots nesting at Rathlin West Lighthouse, Ireland along with other birds or seals would affect the timing of public access visits to many important coastal sites or at least restrict access to certain areas. This is often the case when authorities need to carry out maintenance work.

3.2 PREDICTING THE NUMBER OF VISITORS

3.2.1 Review records on visitor numbers to the area

Enquiries to the local tourist organisations and local authority may be useful in determining the number of potential visitors. There may already be some records of how many persons visited the station or adjacent attractions in previous years.

Carry out local research into other holiday attractions that exist in the area and try to establish visitor numbers. Assess how the new attraction will fit in.

3.2.2 What are the main attractions for visitors?

A review of other local attractions should be carried out. Consider why and for what duration visitors visit the area, and is there enough interest to make a full day's visit or several day's visit. The lighthouse experience may complete a visit to the area.

Any uncertainty as to the opening time of the attraction will seriously effect visitor numbers and produce bad feelings.

3.2.3 Where are the local tourist centres?

Consider the focal points of tourist interest and see how the lighthouse venture would fit in. Is it close to these or will it have to be a significant attraction to draw visitors away from other areas? On the other hand it could be on one of the tourist routes and may pick up the passing trade.

3.2.4 Where do visitors stay?

Identify the main areas offering tourist accommodation

3.2.5 Could the station be included in a regional tour?

By including the attraction with others of greater interest it will provide support. The selling of combined tickets will take advantage of this.

Organising the lighthouse into a regional tour would effectively increase the value of all the attractions.

3.3 AVAILABLE ACCOMMODATION ON STATION:

3.3.1 Is there accommodation for day staff on site?

The available accommodation will directly affect the size of the attraction. All options for the reuse of existing accommodation and outbuildings must be considered. It is preferred that new buildings are not added to the lighthouse estate. The minimum requirements would be for a rest room and toilet facilities for staff.

Assess the potential development of the site for the new attraction. It will determine how large it can be and provide a theoretical potential for visitor numbers

3.3.2 Is there sufficient accommodation for residential purposes?

There are advantages from the security and organisational aspects for responsible staff to live on site.

3.3.3 Is there sufficient room to house exhibits?

Accommodation that allows exhibits to be displayed enhances the value of the attraction, and can provide a waiting area for visitors, prior to the visiting the tower.

3.3.4 Is there surplus accommodation?

This could be used separately for holiday letting, hotel or restaurant ventures.

3.4 INTEREST FACTOR:

How good an attraction can it be?

3.4.1 What is the heritage value of the station?

Consider its architectural and technical value. What is so special about the station that would be of particular interest to visitors? Does it have unique features or is it special for its age?

3.4.2 Are there any historical associations of national or local interest?

Is the lighthouse linked with any local or national history? Does it play a part in any legend? Anything of this nature could be investigated and exploited to provide a greater attraction.

Exploiting any historical importance further increases the attraction value.

3.4.3 What other tourist interests are there in the immediate area?

It may be possible to link the attraction with others in the area relying on a common theme.

3.4.4 Is the lighthouse operational?

The fact that a lighthouse is still operational and 'alive' will capture the imagination of the visitor.

If the lighthouse is not operational more imagination will be needed in setting up the attraction.

3.4.5 Is the station visually attractive?

Does it meet the public's perception of a lighthouse?

3.5 VISUAL ASPECTS:

3.5.1 Does the location of the lighthouse offer a good view?

The location may offer outstanding views of the shore, cliffs, and rocks and of the crashing waves.

Can safe vantage points be designated in order to maximise on this point?

At Mull of Galloway Lighthouse, Scotland the redundant Fog Signal building has been retained and a viewing platform installed to allow visitors to see the cliffs and to bird watch during the season.

3.5.2 Is the site important for its fauna and flora?

This can be enhanced by providing information and identifying vantage points.

3.5.3 Is the lighthouse well maintained?

Review the condition of the current structure, stonework, woodwork and internal and external decorations. Does it convey the corporate image of the service? This will give a good indication as to how much work will be needed to restore it in order to reflect the corporate image, unless the purpose is to display it as a ruin.

3.6 PEDESTRIAN ACCESS TO THE STATION:

3.6.1 Will any special safety measures be required to improve access?

Will it be necessary to provide additional safety railings along access paths? Are the paths adequate or will they need surfacing and proper steps to be provided?

Gannet Is. Lighthouse, Nova Scotia, Canada would be a difficult site to allow public access with dangerous boat landings and difficult steps and paths.

One cannot assume that existing standards used by service personnel would meet conditions appropriate for public access. Rough terrain, sheer drops and wind should all be taken into account.

3.6.2 Are Any Special Safety Measures Or Precautions Required Within The Compound Area?

Is the compound area adequately enclosed? Are there underground tank covers that need to be locked? Are there any access ladders that need to be 'locked off'?

Safety of the visitors must be paramount and will dictate the cost of setting up the areas accessible to the public and the numbers that can be accommodated.

3.7 ACCESS WITHIN THE LIGHTHOUSE BUILDINGS

3.7.1 What safety precautions are required within the lighthouse accommodation and tower?

Review the work needed in order to provide safe access and consider whether access to certain parts of the structure may have to be restricted. The public use of vertical ladders should be avoided.

3.7.2 Identify the areas where the public will have to be supervised.

This will influence the number of staff required and restrict the number of visitors passing through the station.

3.7.3 Can access for disabled persons be provided?

It is likely that the answer will be no. However, it should be possible to provide some access to ground floor rooms with specific displays to allow them to appreciate areas that they cannot view.

Point of Ayre Lighthouse, Isle of Man is typical of many Stevenson Lighthouses which are tall (often in excess of 30 m) with narrow stairs which are unsuitable for the disabled, very young and anyone who is unfit. However, as anyone who has reached the balcony will tell you, the view from the balcony is worth the effort.

3.7.4 Is the lighthouse tower suitable?

Tall towers could require excessive physical exertion to reach the lantern, and impose practical limits on the number of visitors.

3.8 STAFF REQUIREMENTS:

3.8.1 What staffing levels will be required to open the station?

Consider the various possible options for the opening of the lighthouse and associated attractions. It will be necessary to make a prediction on the likely visitor numbers and develop a proper flow pattern.

3.8.2 Are there plans for staff to live on station?

This needs to be reviewed as it will have an influence on the operating costs, but this should be offset by other advantages previously mentioned.

3.8.3 Will extra staff be required to maintain and clean the station and its facilities?

Again, this needs to be considered, as it will affect running costs.

3.9 WHAT ATTRACTIONS AND FACILITIES CAN BE PROVIDED?

3.9.1 How can public toilets be provided?

It will be necessary to consider both an adequate water supply and waste treatment facilities.

3.9.2 Can a cafeteria be incorporated?

Food hygiene and food preparation rules and regulations will have to be followed.

3.9.3 Can a museum be accommodated?

This can provide a valuable asset to the service ensuring that historical items are properly stored and maintained.

3.9.4 Can a souvenir shop be included?

The items sold in the shop should be of a quality that reflects the corporate image of the Service

This souvenir shop has been opened as part of the visitor experience at Hook Head Lighthouse, Ireland and items on sale include a variety of good quality lighthouse memorabilia and locally produced goods and souvenirs.

3.9.5 Can a restaurant be incorporated?

This would probably be run as a separate venture and possibly be privately franchised.

3.9.6 Can holiday accommodation be incorporated?

This venture will need additional resources to run on site and manage the letting arrangements.

3.9.7 Can other tourist facilities be incorporated?

Other tourist facilities can significantly enhance the operation however it needs to be ensured that the Lighthouse remains the major element.

3.9.8 Can a safe children's play area be included?

It is assumed that this would only be provided in connection with the provision of other facilities such as a cafeteria or museum as some supervision will be needed.

3.9.9 Can telescopes be provided for public use?

This serves to illustrate that there will be scope to consider other opportunities to provide equipment that will enhance the attraction.

At Pater Noster Lighthouse, Hamneskär, Sweden the binoculars were available for those climbing to the lantern and these would enable them to investigate passing vessels as well as to admire the local scenery.

3.10 FINANCIAL ASPECTS

3.10.1 Cost of Conversion:

What is the estimated cost of the proposed conversion(s)? Review the estimated costs of the material changes required to the station. Consider the various options. It may be worthwhile considering the phased introduction of the work in order to judge the practical success of the project before moving on to more ambitious plans.

3.10.2 Anticipated Running Costs:

- What will be the cost of staff required to run the attraction.
- What will be the cost of staff required to maintain the attraction.
- Identify any additional maintenance costs.
- These should include costs originating from the additional wear and tear to the fabric of the building.
- Consider and include any other daily running costs not previously covered.
- These could include extra cost of utilities, printing of pamphlets, allowances to staff and so on.

3.10.3 Anticipated Revenue:

- What is the likely revenue from the project?

  This should include returns from car parking, entrance fees and income for any other attractions as appropriate.

What is the anticipated financial return?

- Will any grants be forthcoming?

  The conditions attached to any grant opportunity need to be reviewed to ensure that they are not too onerous.

- Are there any fund raising opportunities?

3.11 CONCLUSION

The above aspects need to be considered for each station in question. After suitable research has been undertaken, it will be possible to carry out a financial assessment of its suitability and to predict further financial improvements if facilities are extended.

A phased introduction of a project can provide an opportunity to confirm the original assumptions and restrict full financial exposure.

3.12 ANNEX – CHECK LIST

The following provides an aid to check that all points have been considered in the form of a check off list. This may be copied and completed for each station evaluated.

Evaluate all the items under each heading.

Consider the importance of each item using a common weighting for all sites being considered.

0 Not Applicable

1 Applicable

2 Very Applicable

3 Essential

Consider all the aspects under each heading and provide a rating out of 10 (10 being ideal).

Multiply weighting by rating to give a Total for each heading.

Total scores for each heading to give total for site.

Station Name:

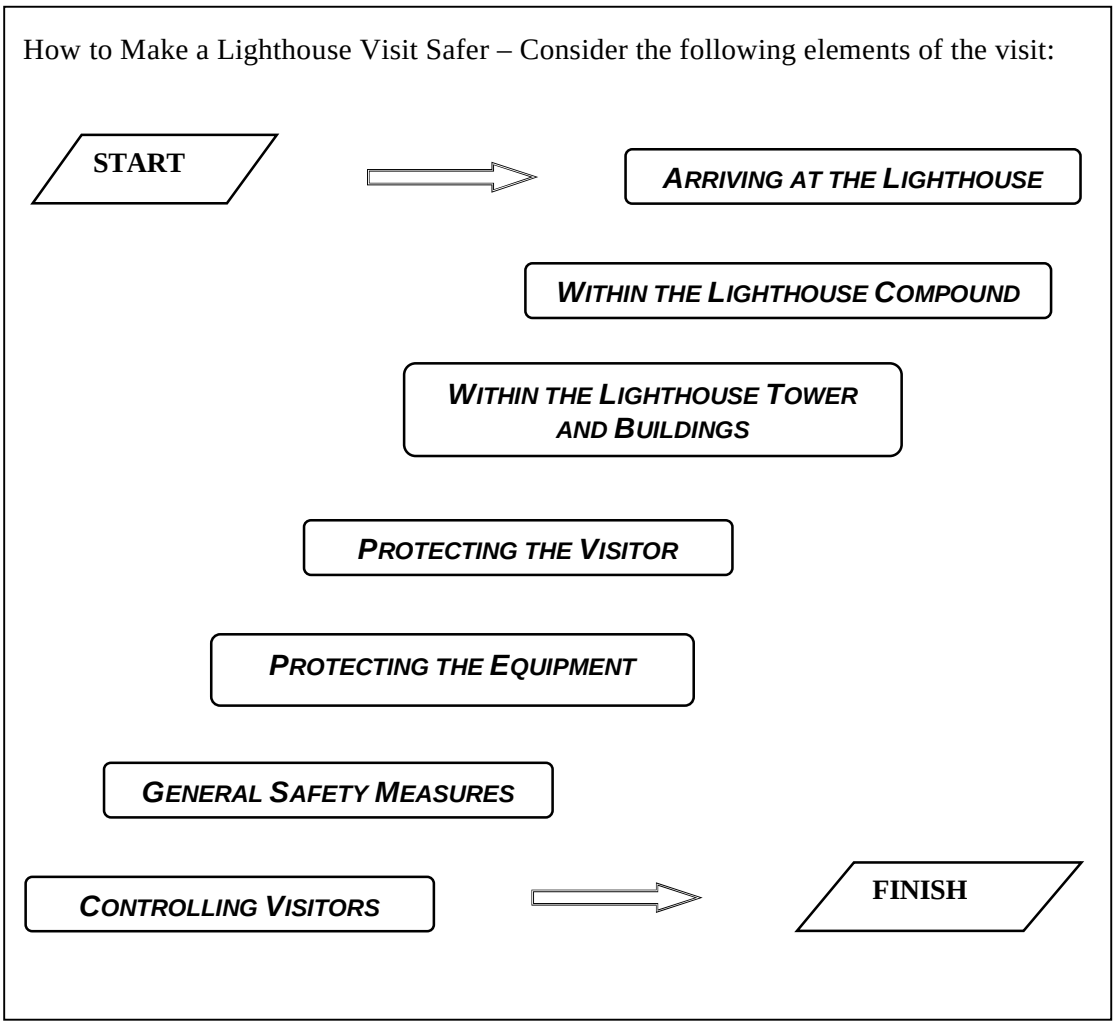
Items that have to be considered	Weighting out of three	Rating	Total
Predicting the number of Visitors			
Available Accommodation			
Interest Factor			
Visual Aspects			
Pedestrian access			
Access within Lighthouse Buildings			
Staffing requirements			
Attractions and Facilities that can be Provided			
Financial Aspects			
		Total for site	

4. HOW TO MAKE A LIGHTHOUSE VISIT SAFER

Prior to allowing public access a thorough risk assessment needs to be carried out. Visitors come in various shapes, sizes and states of physical fitness. It is difficult to judge in advance their capabilities as to climbing stairs and their agility at walking over uneven floors. Ultimately it must be for the visitors to decide for themselves, what they can and cannot manage.

It is important that the visitors are provided with a Safety Briefing, which details areas, which can and cannot be accessed, before entering the site.

The following provides some guidelines that have been arrived at through experience:



4.1 ARRIVING AT THE LIGHTHOUSE

4.1.1 Ensure pedestrian access is kept free from vehicles

If vehicles must use the access, ensure that it is restricted to authorised vehicles only and that either imposing a speed limit or the use of speed ramps controls the speed of them. Ideally a separate pedestrian access path should be provided.

Safety of visitors must be paramount. Most visitors will be on holiday and will include families with young children

4.1.2 Ensure car parking is properly organised and systematic

Parking is necessary and should be so arranged that it can take place safely without supervision. It should also be located away from the lighthouse so as not to detract from the view of it.

At Mull of Galloway Lighthouse, Scotland all parking is out side the boundary wall and all visitors, except authority staff and holiday home residents, leave cars in this car park. Disabled access is available in agreement with the on site warden.

4.1.3 Provide adequate fencing where there are steep drops or other dangers

Use barriers to direct and control the access of visitors.

4.1.4 Ensure steps and slopes have adequate handrails

Assess the quality of steps and upgrade as necessary and practicable to meet national standards.

Care must be taken to ensure that safety measures considered appropriate for authority staff may not be so for the public, for example Fanad Head Lighthouse, Ireland

4.1.5 Extra precautions for access by ferry

Extra staff may be required to receive the boat at the landing and adequate life saving equipment in the form of buoyancy aids, needs to be provided. The surface of the landing must be kept free from slippery algae. These requirements should be made the responsibility of the boatman.

If access is by boat additional safety measures will be required.

4.1.6 Warning signs, first aid and emergency telephones

Warning signs should be provided to direct the public's attention to the existence of the emergency facilities.

Ensure staff are familiar with first aid and emergency procedures

4.1.7 Ensure site security

Provide means of closing off the site when the attraction is closed using locked gates, security fencing and notices.

4.2 WITHIN THE LIGHTHOUSE COMPOUND

4.2.1 Ensure all hazards are removed, hatches, manhole covers are locked, etc

One of the biggest concerns are the covers of underground water tanks that have lifting rings which is an open invitation to "test your strength"! The removal of the rings or the fitting of a locking bar over the cover can make these secure.

The compound area is probably the least known area and where least supervision will be provided. Ensure safety aspects are fully reviewed and in particular pay attention to exit routes out of the area. This could lead onto cliff edges.

- Hazards that cannot be removed should be properly fenced. These fences need to be child proof
- All access ladders should have anti-climb devices fitted
- Out buildings. Ensure all outbuildings, where public access is not to be allowed, are properly and securely locked.

Mull of Galloway Lighthouse, Scotland has now been open to the public for the last five years and to prevent the public and in particular small children from climbing the ornate handrail a plastic mesh was fitted to the inside and this has proved extremely effective.

4.3 WITHIN THE LIGHTHOUSE TOWER AND BUILDINGS

4.3.1 Protecting the Visitor

It is often useful to say why they are out of bounds

4.3.1.1 Fence off "out of bounds" areas

Not all areas will have the same interest factor and be considered suitable for public access.

It is paramount that parents are made fully aware of their responsibilities to properly supervise their children while on site. At some locations it may be wise to refuse entry to unaccompanied children.

4.3.1.2 Decide on any restrictions to access that may be needed

In many towers low parapets exist, handrail stanchions are of non-standard height and spacing. It may therefore be decided that unaccompanied children cannot be allowed. Also it is prudent to prohibit adults from carrying children and babies while climbing the stairs.

It has been found that by limiting access up the lighthouse tower to children over a certain height is very effective. As an example Trinity House uses a height of one metre

4.3.1.3 Provide health warnings

These warnings can refer to steep steps and long climbs. It is not only the physical effort involved but also a warning to those who suffer from vertigo. It is often coming down that causes the greater problem.

4.3.1.4 Identify hazards and mark/protect as appropriate

Certain safety measures will need to be taken along the route. Mark low beams and other obstructions. Also protect the lighthouse equipment from inquisitive fingers! Marking 'do not touch' is not thought to be adequate. Provide warning signs against hot pipes, acid, fog signals and no smoking areas.

At Mull of Galloway Lighthouse, Scotland steps and low doors are marked with black and yellow tape and warning signs are provided, switches are locked or protected with Perspex to prevent inadvertent switching.

4.3.1.5 Remove finger traps

This applies to items such as cable tray, optic rollers and slamming doors.

At North Ronaldsay, Scotland the original lens and bearing are still in use and a plastic guard was fitted around the bearing and the intermeshing teeth of the drive gear were later protected by a brass cover.

4.3.1.6 Paint edges of stair treads

When in an unfamiliar environment and where changes in levels occur, then painting the top edge of the step white will bring it to the attention of the visitors. Where a flight of steps is involved then it is probably not necessary to paint the edges of each step, only at the end of a landing.

4.3.1.7 Floors and steps should be painted with non slip paint

This needs to be effective in both wet and dry conditions.

4.3.1.8 Ensure that mats do not slip or form trips

Non-slip mats are available for this purpose.

4.3.2 Protecting the equipment

4.3.2.1 Provide cautionary signs

To warn of loud noises and of equipment that may start automatically.

Clear and concise signs need to be displayed.

4.3.2.2 Provide barriers and guards

The barriers do not need to be complex if they are sited at a sufficient distance from the equipment. Guards, however must meet health and safety requirements to protect both service personnel and members of the public from rotating machinery.

4.3.2.3 Prevent visitors interfering with lighthouse equipment

Equipment should be designed from the outset with this in mind. The controls can either be activated-only under key control or require a front cover to be opened. On older stations hook-on guards can be made.

4.3.2.4 Provide self-closing gates at the top of steep stairs

This should be standard practice within the lantern area to prevent visitors or service personnel from falling backwards down the stair well.

At Mull of Galloway, Scotland a spring loaded self closing gate was fitted and this has been adopted at all public access sites as well as others where it was felt appropriate.

4.3.2.5 Control visitor numbers and consider what supervision is required

Review the site and proposals and develop a visitor flow plan. Sketching it on a site plan will assist in determining the space required and supervision needed.

A very simple and effective way is to control numbers ensuring adequate space for each visitor and making supervision easier. Over crowding can cause loss of enjoyment and increase danger when accessing steps, etc

4.3.2.6 Consider the child's eye view

Provide boxes or raised platforms for children to stand on. If you do not, then they will climb onto equipment boxes or cable trays to get a better view.

4.4 GENERAL SAFETY MEASURES

In addition to the specific points raised above, there are other general points that should be considered in relation to the staff and the lighthouse.

4.4.1 Ensure that staff are trained in first aid

4.4.1.1 Provide a first aid box

It may be necessary to provide more than one in strategic positions.

4.4.1.2 Ensure that staff are familiar with safety procedures

This will need to cover all eventualities and will probably need to be contained within a manual.

Most of the time there will not be a problem, but should something happen then properly trained staff can tackle the situation quickly and efficiently. It is easy to gain bad publicity from such an incident

4.4.1.3 Provide fire detection throughout the premises

There is always the fear that personnel may become trapped at the top of a tower. A fire detection system will provide sufficient advance warning to allow safe evacuation. The system must be regularly tested to confirm proper operation. Automatic fire extinguishing systems must be locked off during public access.

4.5 CONTROLLING VISITORS

4.5.1 Ensure staff are properly trained and capable of showing visitors around

Collecting gratuities should not be ruled out.

4.5.2 Plan the routes

To avoid bottlenecks, place controls on the number of visitors going into "restricted" areas, e.g. Lantern housing.

4.5.3 All movements must be undertaken in an orderly manner

Avoid over crowding, as it will be counter-productive to the aim of a positive lighthouse experience.

Narrow circular staircases can prevent smooth flow of visitors, particularly if space at the top is limited. However in this instance at Vinga Lighthouse, Sweden there is sufficient space in the viewing area for several people.

4.5.4 Facilities

Toilet facilities should be provided for public use where practicable. Are adequate water supplies available and can the waste be properly treated? Provide waste paper bins strategically around the site.

4.6 ANNEX - CHECK LIST

The following provides an aid to check that all points have been considered.

Items that have to be Considered	Is Item Applicable? Yes/No	Comments
Visitors Arriving at the Lighthouse		
Ensure pedestrian access is free from vehicles		
Car parking arrangements		
Fencing along access		
Handrailing along route		
Special safety precautions if access by ferry		
First aid, safety signs and emergency phones		
Within the Lighthouse Compound		
Hazards within the compound		
Within the Lighthouse tower & Buildings		
Protecting the Visitor		
Out of Bounds areas		
Restrictions to access		
Health Warnings		
Identify hazards – mark and protect		
Look for finger traps and guard		
Decide which stair treads edge need painting		
Ensure floor and stairs are painted non slip		
Are floor mats safe		
Protecting Equipment		

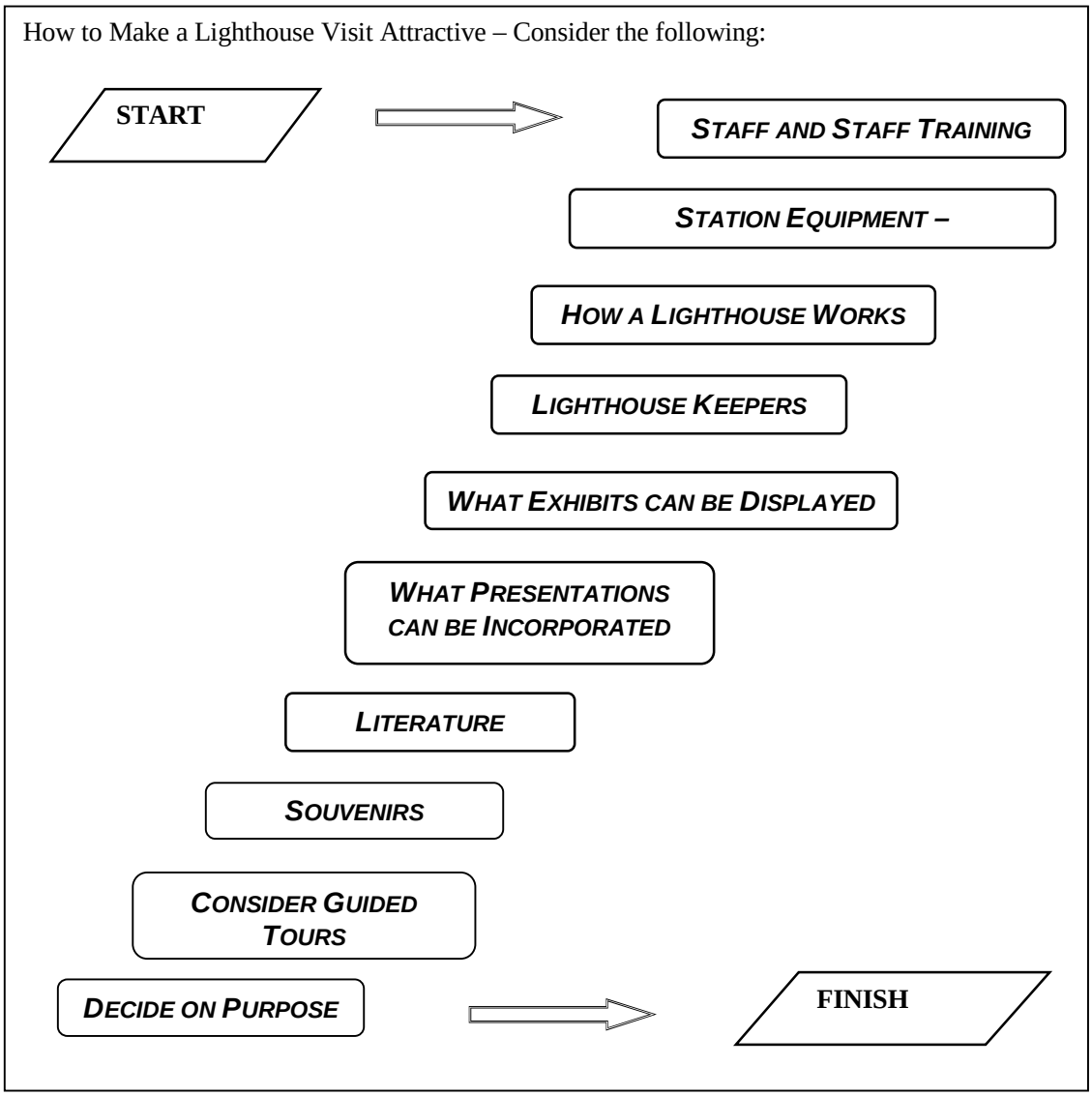
Items that have to be Considered	Is Item Applicable? Yes/No	Comments
Review need for cautionary signs		
Consider barriers and guards for exhibits		
Access likely interference and consequences		
Review need for safety gates		
Access safe visitor numbers		
Consider the child's eye view		
General Safety Measures		
Staff training in First Aid		
Access need for First Aid equipment		
Review Fire Safety measures		
Controlling Visitors		
Staff Training		
Plan visitor routes		
Assess movement restrictions		
Consider visitor facilities		

5. HOW TO MAKE A LIGHTHOUSE VISIT ATTRACTIVE

The whole aim of a lighthouse visit is to maintain the interest of the visitor from the point they approach the station to the time they leave it, and preferably leaving with the feeling that they have had value for money. It is the enthusiasm of the visitor that provides your best advertisement through word of mouth with statements such as "Worth a visit"; "It was really worth visiting" or "The children will like it".

The success will depend largely on the attitude, experience and knowledge of the staff.

The following lists areas where specific interest can be generated and their inclusion, where it is practical within the venture, will enhance the attractions.



5.1 STAFF

5.1.1 Ensure staff have appropriate knowledge

Staff should have a general knowledge of how the lighthouse works, some technical appreciation of the individual pieces of equipment and the running of the facility. The selection of the right staff with both knowledge of the site and management skills is important. They must have a grasp of the necessary language for the area.

5.1.2 Use staff with specific knowledge and experience, such as ex lighthouse keepers

The employment of such people will enhance the facility by bringing to life the exhibits through their working experience and stories. It will also ensure that the exhibits are authentic. Staff need to be polite and courteous to visitors.

Staff must be considered as the main asset to success. Time and effort must be given to ensuring that the right staff are employed and they receive the right training and familiarisation

5.1.3 Provide necessary training to enable them to carry out their job

It may not be possible to employ somebody straight away with the necessary flair and experience so familiarisation training will be necessary, carried out on site or at a similar facility nearby.

5.2 GENERAL INFORMATION

5.2.1 Identify vantage points and the position of information boards

This needs to be done at an early stage and will be needed when planning guided tours or considering visitor numbers. Too much information in one spot will cause a bottleneck.

This sign at the entrance to the combined site of Fort Rodd Hill and Fisgard Lighthouse, British Columbia, Canada is attractive with useful information without overloading the visitor at the start of their visit.

5.2.2 Display boards

These need to be as clear as possible, readable from the vantage point and the material suitable to both adult and children, using a balance of text, diagrams and pictures. With the use of computers it is easy today to produce high standards of display information. However, suitable mounting can become expensive.

The quality of signs must be compatible with the environment in which they are to be displayed.

5.2.3 Enhance the display/attraction by maximising the view of it

Provide additional viewing panels, mirrors or CCTV to give the best views of the individual equipment so that all the important features can be seen.

This picture is one of the eight views available on the NLB website www.nlb.org.uk through a satellite link from the webcam situated on the balcony of Mull of Galloway Lighthouse, Scotland

5.2.4 Equipment diagrams

These need to be as clear as possible and in some cases a simplification of their operation may be necessary. The aim is to allow visitors to see and understand how it works.

5.2.5 Drawings

A lot can be gleaned through drawings, the older ones tend to be of a civil or mechanical nature. Very early site or building drawings were an art form in their own right, using coloured shading to identify the various sections. These can be displayed generally or to show a specific point.

Old drawings of the lighthouses and equipment provide interesting exhibits such as this one of the lantern and dome of Noup Head Lighthouse, Orkney, Scotland signed by D.A. Stevenson on 28 January 1897

5.3 HOW A LIGHTHOUSE WORKS

5.3.1 Describe the whole lighthouse

Identify the various parts of the lighthouse and its purpose for being there.

Describe the purpose of the lighthouse or buildings as it is often taken for granted and forgotten Show charts of the area and explain how it fits in with other AtoNs in the Area.

5.3.2 Show or demonstrate the aids to navigation and other station equipment working

It is important that the visitor has an understanding of how the equipment works and this is best done by seeing it working, or for it to be demonstrated. If it is found difficult to demonstrate or display equipment, then consider providing models that can be used to illustrate its operation.

Visual demonstration alone would justify the opening of a station. Examples of original lens such as this from Isle of May exhibited at The Scottish Lighthouse Museum, Fraserburgh, Scotland can be shown as retained in use or displayed elsewhere on site.

5.3.3 Equipment description

Follow a standard format for the provision of information regarding individual pieces of equipment. Ensure that the name of the equipment, its key elements, make, when built and purpose are provided in a form that best suits the exhibit and visitor.

5.4 HISTORY OF LIGHTHOUSE KEEPERS

5.4.1 Provide details of keepers' duties

Although we tend to concentrate on material things, the lifestyle and duties of the keepers are equally important and are more likely to be lost as time goes on. Show how they have changed over the years with the introduction of new equipment.

This display at Mizen Head Visitor's centre, Ireland is a novel way of displaying the various hobbies that lightkeepers used to pass their time on isolated sites.

5.4.2 Describe how the keepers and their families lived on site

Describe how the keepers overcame the logistical problems of living on site. Where did their food come from? How were the children educated and where and how were stores delivered to station?

Describing the keeper and their family life is important to the visitors as they can relate it to themselves

5.5 EXHIBITS:

5.5.1 Redundant equipment and their history

Provide descriptions of artefacts and relate them to current day equipment. Provide dates for the changes. Enhance the displays by showing their evolution, illustrate unique features and provide working examples of redundant equipment previously used on the station.

It is not necessary to have high-tech equipment to produce information sheets, notices and printing. Computers with basic software and a low cost colour printer can produce very professional results

5.5.2 Station artefacts

These should include service equipment such as telescopes, clocks and other items not already displayed on the station. All need to be properly identified and their use/history described.

This cannon has been left on site at Vinga Lighthouse, Sweden where it was used as a fog signal when the site was manned.

5.5.3 Interactive displays

These need to be interactive with the visitors and can take the form of working displays, models, video or other devices to illustrate specific points and to aid understanding.

5.5.4 Equipment displays

Provide exhibits of other equipment not associated with the station but specific to the service such as optics, light sources and other lighthouse equipment.

At the Scottish Lighthouse Museum many lenses are displayed but others have been retained for display at lighthouses or nearby visitor attractions. This display also gives a background to the Stevenson family of Engineers

5.5.5 Navigation charts

Provide examples of navigation charts and navigation equipment explaining how they are used to navigate showing the 'users' aspects.

Ensure that the visit is part of an educational experience

5.6 PRESENTATIONS

5.6.1 Audio visual

This could be the running of a standard service presentation or something more specific to the station. A full audio visual display requires room to seat visitors and provide the right atmosphere. Small audio/slide presentations can stand-alone and be included as appropriate. Topics could include lighthouse organisation and pilotage.

Trinity House has produced a general service video but with a final section that deals with the specific lighthouse at which it is being shown

This can provide an opportunity to showcase the Maritime Administrations responsibilities as well as other marine related activities

5.6.2 Computer based

Allowing visitors to access a database to show other lighthouse information or as a game of knowledge.

5.6.3 Demonstrations

Arrange for specific demonstrations of skills and practices to be run as special events, which have been previously publicised.

Special events advertised in advance can be of particular interest encouraging revisits to the attraction particularly b the local community.

5.7 LITERATURE

5.7.1 Exhibit specific

This may be a book or pamphlet relating to a specific piece of equipment or exhibit and may refer to books that can be purchased. It must be decided whether they will be free and included in the entrance fee or charged for separately to avoid waste.

5.7.2 Station specific

This covers leaflets about the station relating to the visit or specific books written about the station.

This pamphlet is one of a series produced by the Northern Lighthouse Board, Scotland to provide background information to visitors about the history of the specific lighthouse and of the organisation as it is today

5.7.3 Service specific

This would cover descriptions of the lighthouse service; however reference to specific lighthouses could allow it to double as station pamphlet. This could prove a more economical option than printing individual guides.

The publishing of a service and general guide will provide significant savings on the printing costs due to the economies of scale

5.7.4 Locality specific

These would be publications covering the locality and published by outside bodies dealing with items of common interest and may or may not include reference to the lighthouse.

5.7.5 Local tourist information

Display leaflets on other tourist attractions in the area.

This brochure was produced in Green Spain, for a project linking fishing towns in Cantabria, Asturias and Galicia. This also links in with the AT Lights project which promotes tourism through lighthouses around the Atlantic Coast of Europe.

Similarly, leaflets advertising the lighthouse attraction should be printed and distributed through the local or national tourist information service.

5.7.6 Bibliography of lighthouse literature

This could be published on a service wide basis and include details of books, novels and other literature material making reference to lighthouses.

5.7.7 Multi lingual literature

This book "Sentinels of the Ocean" was published under the AT Lights European funded project with information provided in three languages Spanish, English and French.

The need for printing guide books and leaflets in other languages should be considered.

5.8 SOUVENIRS

5.8.1 Station specific

It will be dictated by the likely interest on what station specific items can be economically justified although some may be of general interest as well. Quality and price must be carefully considered.

Enthusiasm must be tempered with sound financial management

5.8.2 Service specific

Items produced generally by the service and once again probably a better economical option than making them too station specific. Economics of scale come into play.

A few examples of inexpensive souvenirs from around the world include postcards, calendars, pin badges, candles, posters and thermometer.

5.8.3 Books and postcards relating generally to lighthouses

The scale of merchandise needs careful consideration and a policy needs to be made from the beginning as to the quality of goods to be sold. It should reflect the perceived standard of the whole organisation. It also adds a requirement for extra manning and accountability of the staff for the stock.

5.9 GUIDED TOURS

5.9.1 Consider duration

Careful planning of a guided tour is necessary as its duration must be right if the visitors' interest is not to be lost. This needs to apply to both adults and children. Also the duration and numbers in each tour will dictate the throughput of visitors.

5.9.2 How are they to be controlled?

In some areas visitors can be allowed to browse as they wish but in others they will need to be supervised for safety reasons. It will be necessary to decide the maximum numbers of visitors in each party and whether supervision by one member of staff is adequate.

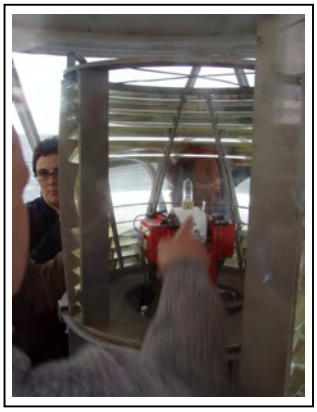
Rules need to be established from the very start and where restrictions will apply, make it clear to visitors in the form of notices or briefings.

5.9.3 How will the tours be organised?

Will tours be arranged to start at set times, as and when sufficient persons arrive, or by sale of tickets in advance?

5.9.4 What is the tour to cover?

It will be necessary to decide what items of interest the tour will cover internally and externally. The likely effect of the weather needs to be considered and if it is too bad, what the effect of cancelling the external part will be.



The attendant lightkeeper explains the operation of the light to a group of visitors to Somos Lighthouse, Ribadesella, Spain.

5.10 PURPOSE

5.10.1 Policy

It should be made clear the reason for exploiting the lighthouse, stating the service policy on the subject.

5.10.2 Revenue

It needs to be made clear as to where the income is going and why.

Experience shows that generosity increased when a clear aim and purpose is communicated

5.10.3 Aims

Strong aims will help to increase the visitors' satisfaction on the grounds that it is for a good cause. Some aims specific to the station will be preferable.

5.11 CONCLUSIONS

The visit to a lighthouse should convey the same core purpose of the Lighthouse Organisation itself, to provide a quality service to the mariner. All items connected with the tour should reflect this.

Information and presentation should be aimed at both adults and children and full use should be made of experienced staff with an understanding of the Service.

5.12 ANNEX – CHECKLIST

The following provides an aid to check that all points have been considered.

Items that have to be Considered	Is Item Applicable? Yes/No	Comments
Staff		
Ensure they have appropriate knowledge		
Decide on specific knowledge required		
Identify required training		
General Information		
Identify vantage points		
Consider display boards		
Consider ways of enhancing displays		
Provide equipment diagrams and details		
Display Drawings		
How a Lighthouse Works		
Description of Lighthouse		
Demonstrations of Aids to Navigation		
Consider equipment descriptions		
Lighthouse Keepers		
Describe keeper's duties		
Describe how keepers families lived on site		
Exhibits		
Provide history of redundant equipment		
Display Service artefacts		
Interactive displays		
Equipment displays		
Navigation charts		

Items that have to be Considered	Is Item Applicable? Yes/No	Comments
Presentations		
Audio Visual		
Computer Based		
Demonstrations		
Literature		
Exhibit specific		
Station specific		
Service specific		
Locality specific		
Local tourist information		
Bibliography of lighthouse literature		
Multi lingual literature		
Souvenirs		
Station specific		
Service specific		
Books and postcards		
Guided Tours		
Consider duration		
How they are to be controlled		
How they are to be organised		
What is the tour to cover		
Purpose		
Set Policy		
Set revenue levels		
Set aims		

6. FUNDING OPTIONS FOR THE CONSERVATION OF HISTORIC LIGHTHOUSES

The success of any business venture is very much dependent upon a thorough analysis of the funding potential for the project.

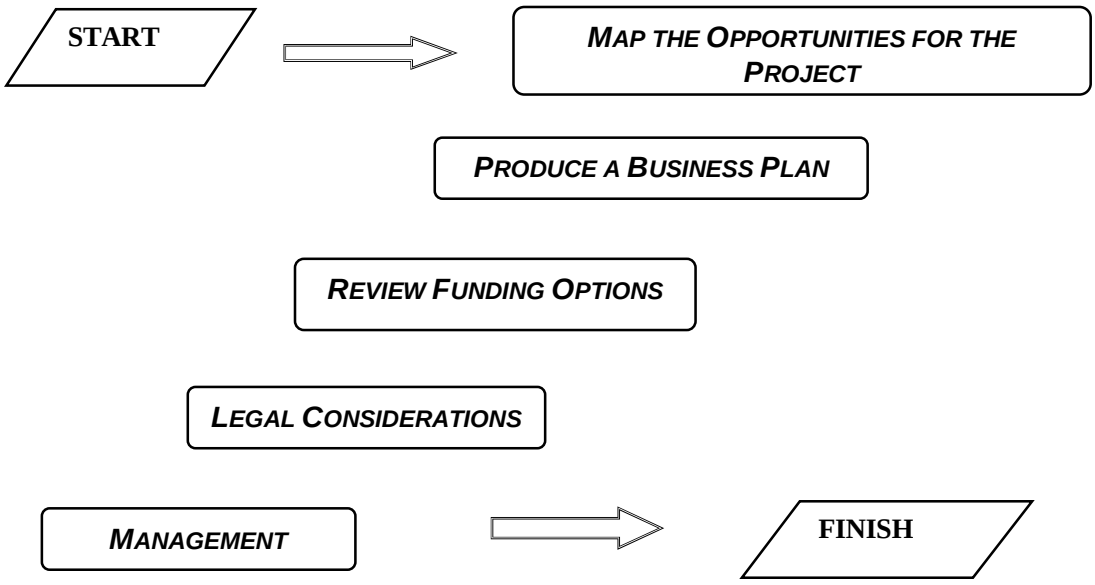
In the following chapter, an attempt has been made to highlight some key areas worthy of consideration in the very early stages of planning.

Start by assessing opportunities and conclude with ensuring proper financial administration practices are put in place.

Although not an exhaustive list, this chapter should provide for an excellent start.

For further information see Chapter 3

Funding Options for the Conservation of Historic Lighthouses – Consider the following approach to sourcing funding:



6.1 MAP THE OPPORTUNITIES FOR THE PROJECT

6.1.1 Scope of the Project

- Level of Historic Value (Local and National)
- Existing government policies on conservation (National and Local).

Does your project address conservation of the lighthouse or will it damage it? This is Castro Urdiales Lighthouse, Spain where wrong decisions taken at the start of a project could have a negative impact on the truly historical structure.

- Level of Public Interest.
- Public Accessibility.
- What facilities are available?
  - In the community to support tourism.
  - On site (e.g. lighthouse estate).
- Is the lighthouse part of an existing or future maritime site or initiative?
- What other marketable assets are in the area?
- Can your lighthouse be part of a package tour (e.g. other lighthouses or lighthouse/shipwreck etc.).
- Can it be used for marketing?
- Merchandising.

Examine opportunities to ensure success of the project

- Determine if your project is for profit or non-profit.
- Do you have support from non profit conservation societies?

6.1.2 Produce a business plan

Prepare a business plan considering the whole life of the project based on the scope.

- Consider life of the project (minimum 5 year plan).
- Consider the effect of National Legislation on the project.
- Define what you plan to offer.
- Conduct Market Analysis for the area (estimate potential income - numbers and timing of tourist visits).

- Estimate start up costs (capital and other costs e.g. consultancy). Assess the scale of funding required.
- Project annual costs (operation and maintenance).
- Prepare project justification.
- and finally – make a "Go, no go decision".

Plan should be updated regularly as circumstances change

6.2 REVIEW AVAILABLE FUNDING OPTIONS

Funding is available from various sources depending on the nature of the project and Local, Regional, National and International arrangements. The following are areas that should be considered and investigated.

- International / European e.g. UNESCO – World Heritage.
- Government Funding – National, Provincial/State – Local/Municipal.

Need to explore all possibilities for revenue generation

6.2.1 National (examples)

- Provide Aids to Navigation (part funding where government requires continuing operation of Aid to Navigation) .
- To support heritage based projects such as museums, which may include Lottery funding.
- To promote tourism.
- To enhance the economy and trade.
- To provide protection of the environment.
- To promote educational aspects.
- To promote public access and awareness.
- For Research.
- For Defence.

6.2.2 Regional/Local Government (Examples)

- Regional/Local Government would provide funding for similar factors as listed above under National Government.
- Planning Authority can provide supporting grants for the maintenance of Listed Buildings.
- Regional Development Agencies can provide funding to support the development of businesses and enterprises as part of employment regeneration.

When Kinnaird Head Lighthouse, Scotland was replaced by a modern structure, the first lighthouse built on behalf of the Northern Lighthouse Board in 1787, agreement was reached with Historic Scotland to take it over and maintain it as a scheduled ancient monument, the highest level of protection offered to a building in Scotland

6.2.3 National (non-government) funding

This would include Charitable Trusts that have their own individual aims and objectives into which the project may fall.

6.2.4 Commercial Sponsorships

Caution - Determine appropriateness of the sponsor before entering into an agreement.

6.2.5 Potential sources of revenue from Commercial Operations

Revenue arising from:

- Renting out property (Buildings or Land), Licensing – Restaurants, Accommodation, Meeting Facilities, Film companies, Photography.

This is a novel idea at Fisgard Lighthouse, British Columbia, Canada where the lighthouse is being used as a backdrop for wedding photographs.

- Branding and Merchandising (Products).
- Entrance fees.
- Allowing public access (Tours of the site).
- If appropriate, renting space for Commercial Advertising.

- Featuring in advertising.
- Camping Sites.
- Adventure Tours.
- Partnerships.

6.2.6 Public Sponsorship

Funding support may be provided by the General Public through:

- Donations.
- Bequests.
- Fund raising involving public support such as 'friends of', sponsored walks, etc.

6.2.7 Other Funding Options

- Possible savings made under Tax Laws e.g. covenants where in certain situations previously paid income tax can be reclaimed from the Government or tax exemption for charitable organisations.
- Disposal of property to allow reinvestment.
- Borrowing against assets (mortgaging).
- Consultancy and contractual services – skills which are saleable.
- User charges e.g. light dues.

Consider the effect on the site as a whole and the implications of future neighbours.

6.3 LEGAL CONSIDERATIONS

Where the AtoN is exhibited then there is a legal requirement to protect them from interference. The activities of the project should not affect the operation of the AtoN by day or by night.

Legal considerations related to business ventures, legal liability, financing, partnerships, bankruptcy protection etc.

Once an initial source of funds has been identified and the necessary contacts have been made, the aim is to convince those administering the funding that it meets their relevant criteria and objectives. The provision of funding particularly in the form of grants will have certain conditions attached covering in particular the closure or failure of the venture, which may have serious financial implication on those involved. Those sponsoring such applications should fully consider the consequences of such conditions.

The long term future of the site should be considered if too large a scheme is attempted and fails with large debts. How will you protect the National asset?

For further detail refer to Chapter 2, Legal Issues of Alternative Use.

6.4 MANAGEMENT

The project could fail to live up to expectations if it is not managed clearly and effectively during start-up and thereafter.

The following processes are considered essential to the management of the project:

- Accounting Practices (Financial Records, Invoicing, etc.).
- Stock Control.
- Asset Management.
- Revenue collection control.
- Audits.
- Expenditure Control.
- Set Standards.
- Insurance.

6.5 ANNEX - CHECK LIST

The following provides an aid to check that all points have been considered.

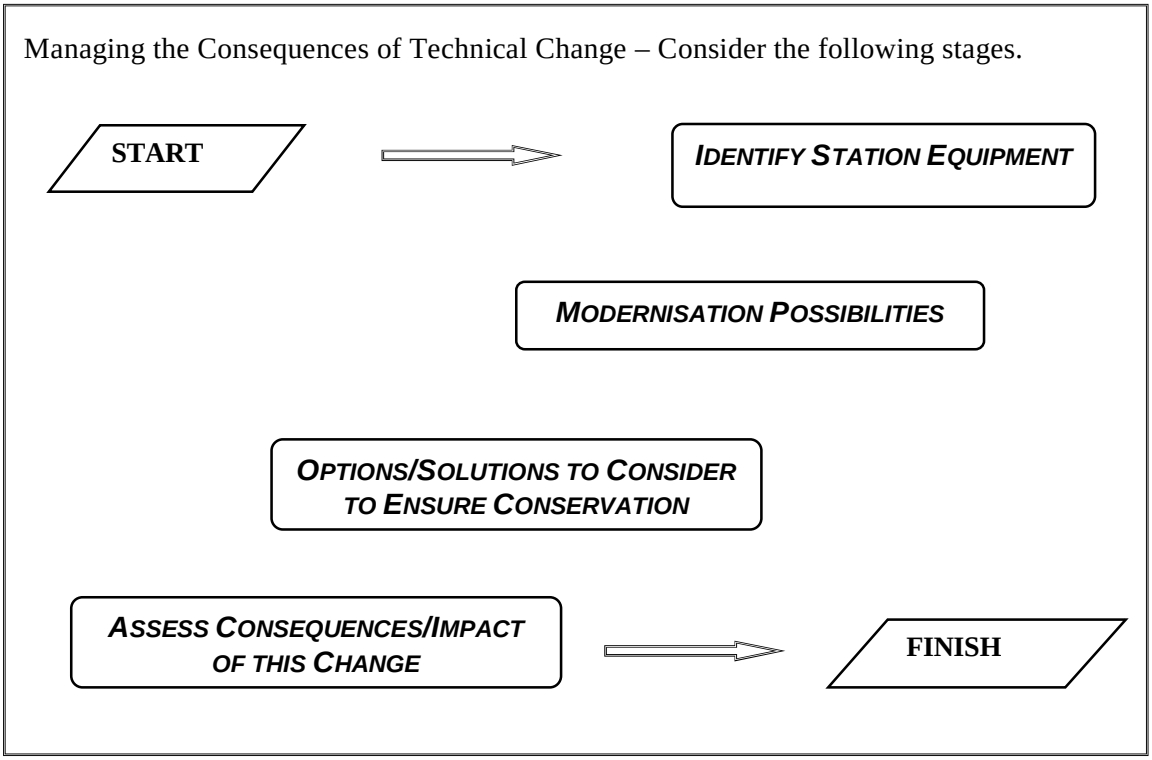
Items that have to be Considered	Is Item Applicable? Yes/No	Comments
Have you assessed the scope?		
Historic Value		
Public Interest		
Public Accessibility		
Available Facilities		
Availability of other marketable assets		
Links to other maritime sites or initiatives		
Profit or non-profit		
Support from other bodies		
Business Plan		
Have you prepared a business plan?		
Market Analysis		
Start up costs		
Annual O&M costs		
Project Justification		
Go, no go decision		
Review Funding Options		
International		
Government		
Regional		
Commercial sponsorship		
Commercial Operations		
Public Sponsorship		
Other Funding Options		
Legal Considerations		
Management		

7. MANAGING THE CONSEQUENCES OF TECHNICAL CHANGES

During the modernisation plan and process, Authorities should seriously consider retaining redundant equipment on site as it contributes significantly to the heritage and tourism value of the light station property. Furthermore, wherever practical, authorities should attempt to integrate redundant equipment with the modern technology.

A presentation made by Philip Hyde and David Brewer of Trinity House (UK) at the 2002 IALA Conference is reproduced as Annex B to this chapter and provides a good example of how to deal with this issue

Note: Architecture is a major consideration throughout the process



7.1 IDENTIFY STATION EQUIPMENT (INVENTORY)

- Optic System.
- Lantern.

Identify unique or original design and architectural features throughout the estate. At Oksøy Lighthouse, Norway many original features of the lighthouse have been retained and future conservation will be assisted if they are included in an inventory.

- Tower.
- Dwelling – Living Quarters.
- Outbuildings (storage sheds etc.).
- Power Source.
- Other (fog signal, DGPS etc.).

7.1.1 Optic systems (examples)

- Light source (lamp changers, burners…).
- Lens (dioptric, catadioptric).
- Reflectors and sectors (dioptric, catadioptric).
- Pedestal.
- Motor.
- Rotating system.

This alternative method of retaining redundant equipment on site was seen during a visit to a lighthouse on Spetses, Greece. The lantern pedestal became available during modernisation works and was converted to a fountain.

7.1.2 Lantern – Structure and material

- Cupola and glass.
- Lantern balcony.
- Weather vanes.
- Exhaust vent.

On this tower at Dunmore East, Ireland many original features can be seen such as the dome, lantern panels, vents, weather vane, lightning rod and handrail.

7.1.3 Tower

- Material (wood, cast iron, stone, concrete, etc.).
- Tower balcony.
- Railing.
- Stairway.
- Windows (window casing) and doors.
- Counterweight device.
- Vents.

The clockwork mechanism has been retained at Somos Lighthouse, Ribadesella, Spain and in the event of a drive failure; the clockwork mechanism could be operated to maintain the AtoN.

- Watch location (underneath the lantern).
- Watch room / Service room including furnishings.
- Wall and flooring materials.

Visitors are shown round the room containing redundant fog signal Kelvin engine and compressors sets at Mull of Galloway Lighthouse, Scotland.

7.1.4 Dwellings – Living quarters

- Materials.
- Office/Domestic equipment and furniture.
- Log and Visitor books / Stationary / Clocks.
- Operating procedures.
- Water supply and collection system.
- Doors and windows.
- Other items deemed important to the heritage of the site.

7.1.5 Outbuildings

- Storage sheds.
- Fog signal alarm building.
- Gun powder house / cannon.
- Outhouse
- Barns

This original store building at Holmögadd Lighthouse, Sweden has been retained and allows the overall layout and operation of the site to be appreciated by the visitors

- Outdoor bread oven.
- Signalling station (mast, anemometer, weather station, etc.).
- Other.

7.1.6 Power system

- Identify the source (oil, gas, etc.).
- Identify the plant:
  - Combustion engine;
  - Compressors;
  - Generators;
  - Coal stoves;
  - Old battery storage, containers,

7.1.7 Other

- Fog signals (Diaphones, horns, explosive types, bells, whistles, etc.),

The fog signal at Ardnamurchan Lighthouse, Scotland was made redundant many years ago, but the equipment has been retained on site and now forms part of an excellent visitor experience including a cafe and small museum

- Radio beacons,
- Racons,
- Radar and navigational equipment,
- Telemetry,
- Communications (radio, telephone),
- Lightning protection,
- Telescopes and binoculars,
- Uniforms,
- Nautical charts,

7.2 MODERNISATION POSSIBILITIES

7.2.1 Optic system

- Strong potential exists for complete removal and replacement with modern technology.

During the modernisation process it is important to assess the feasibility of keeping original equipment in use

7.2.2 Lantern

- It is possible that the lantern could be removed completely to reduce maintenance costs and improve reliability.
- Lantern could also be altered using new materials.

7.2.3 Tower

- Cladding replacement.
- Frames (doors and windows).
- Replacing railings and grates with modern materials.
- Adding equipment to the tower (example: antennas, solar panels, security systems).

DGPS antenna have been added to Loop Head Lighthouse, Ireland and must be included in the use of the lighthouse as an Aid to Navigation in the past and on into the future.

7.2.4 Dwellings

- Heating systems.
- Frames (doors and windows).
- Flooring.
- Cladding replacement.
- General household improvements.
- Roof covering.

Concern exists regarding removal of surplus buildings, which would affect the historical value of the site.

7.2.5 Outbuildings

- Similar concerns as with the dwellings.
- Fog signal removal.

7.2.6 Power systems

- Changeover to renewable sources.

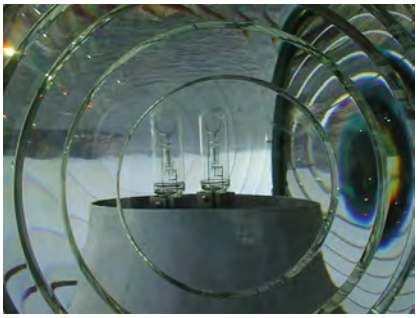
7.3 OPTIONS / SOLUTIONS TO CONSIDER TO ENSURE CONSERVATION

Options are listed according to their importance for conservation

Prior to assessing options it is important to consult with heritage bodies in your region

- Continued use of existing equipment.
- Attempt to combine existing equipment with new technology where possible.

Ensure all modernisation options are assessed and select the one that has the least impact: at Lindesnes Lighthouse, Norway the original lens has been retained but the new electric source added.



- Replace existing systems but retain old systems on site for display purposes.
- If not possible to retain old equipment on site, it should be removed intact and protected for display in another location.
- Attempt to locate new equipment in locations that minimize the visual impact to the estate.
- If found necessary to replace railings, siding, roofing, frames etc., with modern materials, it is suggested that the design and style be maintained as close as possible to the original.
- You may wish to combine parts from several units, in order to preserve a good example of the item.
- Remove equipment and package for proper storage in a protected area until the unit can be properly displayed. (Important to ensure documentation of the item).
- Should the situation exist whereby you have a multitude of similar items you may consider retaining the best examples and transfer surplus items to other associations.

- Surplus buildings should be considered for alternative use in order to maintain the heritage integrity of the estate. (Example: museums, interpretive centres, etc.).

At Wicklow Head, Ireland a redundant tower which had fallen into a serious state of disrepair was taken on by The Irish Landmark Trust and the inside of the tower redesigned to provide a two bedroom holiday let with lounge as shown in the photograph.

- Demolition or removal of buildings should only be considered if it is a safety hazard or in other exceptional circumstances.
- Attempt to avoid disposing of surplus land in order to protect the integrity of the site, or at the very least, determine the minimum amount of land required for current and future needs.

If finances are driving your decision you may want to consider alternative funding solutions if it contributes to preserving the heritage aspect of the estate. (refer to Chapter 6)

7.4 ASSESS CONSEQUENCES / IMPACT OF THESE CHANGES

Note: This section relates to negative impacts on the heritage value of the estate if the above options are not considered.

- Loss of local cultural and heritage significance.
- Loss of potential economic value.
- Loss of potential link to other maritime heritage initiatives.
- Lighthouse estate tends to attract visitors which allow for the development of other tourism products like hotels, gift shops, bed and breakfasts, etc.
- Lighthouses are viewed as passionate symbols of each community and, as such, any move to alter or sell these estates will result in a very negative reaction.
- Potential loss of strategic coastal lands, which might be of future national interest, if a lighthouse estate is sold.

Note: This section highlights the positive impacts of modernisation

- More cost effective aid to navigation.
- Environmentally friendly.
- Improved availability.
- Life extension of the property.
- Could result in a decision to continue the lighthouse as an aid to navigation.
- Improved safety.
- Improved public access.

7.5 ANNEX A – ASSESSMENT TEMPLATE

Note: The following is a template that could be used when assessing the consequences of technical changes.

STATION EQUIPMENT	MODERN. POSSIBILITIES (Y/N)	OPTIONS	SOLUTIONS/CONSEQUENCES
Optics			
Drive system (e.g. clock work system)	Yes (with electrical, AC or DC, drive system)	Gears and drive shaft can be retained on site	Rest of the equipment (clock work can be left on site for display or removed)
Light source (e.g. lamp changer)			
Lens			
Rotating system			
Reflectors / Sectors			
Lanterns			

7.6 ANNEX B

Consequences of Technical Changes in relation to the Preservation of Lighthouses

Philip Hyde B.Sc. (Eng), C.Eng., M.I.C.E
Principal Engineering Manager
David Brewer
Director of Administration
Trinity House Lighthouse Service
Tower Hill
London EC3N 4DH
United Kingdom

The paper will review the current changes taking place as the result of re-engineering work in relation to lighthouse equipment and structures. It will illustrate the problems and the methods used to overcome them using recently completed Trinity House projects. It will deal with the current policies on the retention and disposal of redundant equipment and introduce the idea of conservation policies.

The paper will also present the Trinity House Lighthouse Service's experience in practical uses for redundant lighthouse property with the example of Lizard Lighthouse.

7.6.1 Introduction

From the day that the very first lighthouse was built, man strived to find ways of improving its efficiency and performance in order to benefit the mariner.

Fig. 1 Dungeness Lighthouse

The pace of change has never been so great than during the last century where world technology has developed so fast as to dictate the requirements of aids to navigation. Modern lighthouse equipment has kept pace through the use of modern technology and materials.

At one time lighthouse technology was at the forefront of man's achievements but now it has lost this privilege and has had to adapt technical achievements, which have been developed in other fields. This is particularly the case in the electronic and communication field where obsolescence occurs within five to ten years due to the development in components and circuitry.

The physical space requirements to house aids to navigation have reduced with the use of modern high efficiency light sources and small focal length lens assemblies. The role of the traditional aid to navigation has also changed moving from their need to provide long range landfall marks to that of supplementing radio navigational aids and adopting more of an insurance or confirmatory role.

The majority of Lighthouses we see today were built to accommodate the equipment of the early 20th Century such as compressed air fog signals, generating plant and keeper's accommodation.

In order to maintain an effective and cost effective service, Trinity House undertook a review of all its aids to navigation to ensure that they met the up-to-date needs of the mariner and identify where the new technology could be used to advantage.

A programme of automation was started in 1980 for the automation of all offshore lighthouses followed by the manned mainland stations. Advances in communications and reliability had reached a point where the removal of keepers would not be detrimental to the availability of the aids to navigation. The destaffing of the lighthouses and the introduction of central control offered the greatest potential financial savings with a typical pay-back of the automation costs within three to four years and a predicted life of 15 years.

Upon the completion of this programme attention turned to solar conversion of offshore stations that not only provided further savings over constant running generators but also offered environmental advantages. However one effect of this was to remove any electrical power for the conditioning of the station accommodation.

7.6.2 Consequences of Technical Changes

7.6.2.1 The Effects on Equipment

The navigation light probably serves best to illustrate the speed of evolution. The first recorded lighthouse was The Pharos built around 285 B.C. and a wood fire was kept burning on top to warn and guide ships. This continued virtually unchanged except with coal being burnt. Then to encourage the coal to burn more brightly and protect it from the weather the top of the tower was enclosed using glass windows to allow the light to be seen. This was the start of the lantern as we know it today.

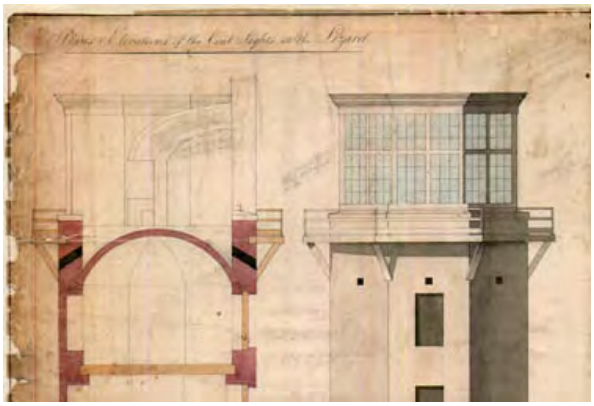


Fig. 2 Lizard Lighthouse – Lantern Pre 1812

The light source similarly evolved from the open burning of coal, to the use of candles, the use of reflectors to enhance the light and then on to oil wick burners and multi wick burners.

Developments continued increasing the intensity of the light sources using acetylene, paraffin vapour burners and up to today's electric lamps. The search for improvement still continues today. The use of polished reflectors gave way to the use of glass lenses.

However, it is no longer towards increasing the range of the navigation lights but to improving their efficiency. Complimented by the use of radio aids to navigation there no longer exists the need for such generous long range lights, in fact ranges are being reduced. This in turn allows the solarisation of many offshore and floating aids to navigation.

The same philosophy applies to the other aids to navigation where efficiency versus power consumption is equally important if the solarisation route is to be followed.

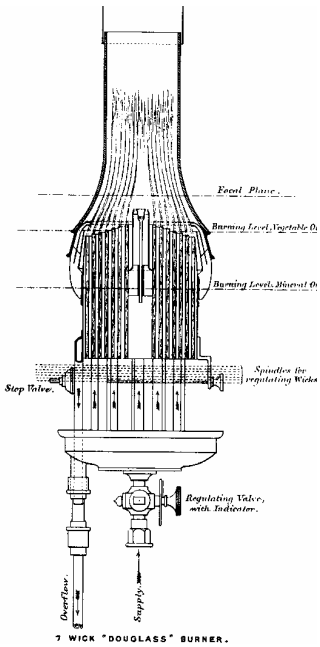


Fig. 3 – Multi wick burner

So what are the consequences of technical change?

New equipment will replace old, methods and practices will change. The old equipment will join other equipment that we already have on or off site that are already considered as 'artefacts'. Unfortunately not everything can be kept so some selection process must be introduced. Their future must be reviewed in order to ensure that the Service needs are protected and information is not lost for future generations.

7.6.2.2 Retention of Historic Artefacts and Equipment

There are no hard and fast rules as to how historic equipment and artefacts must be dealt with. Each must be considered in its own right as to what it is, its possible reuse, location, rarity and history. The preferred sequence is as follows:

- Can the equipment be modified and reused?

If not, then is the history of the equipment station specific:

- Left in position as an exhibit.
- Left on station as an exhibit.

These two options are the most important from Trinity House's point of view

If not, then:

- Exhibit elsewhere.
- Remove to Stores for use to provide spares support
- Scrap (last resort)

Such processes will involve costs.

Fig. 4 Filament lamp and lamp changer

7.6.2.3 Examples of what can be done

7.6.2.3.1 Large Filament Lamps

Large filament lamps are no longer available as they have become unique to lighthouse use. They were hand made and prohibitively expensive.

In order to retain the large glass optics that require these large diameter light sources the following can be done:

- Install modern energy efficient lamps;
- Use glass spreaders to increase divergence of the beam;
- Use lamp clusters to recreate the large size light source;
- Etch the glass envelope of the lamp(s);
- Use a glass spreader around the light source.

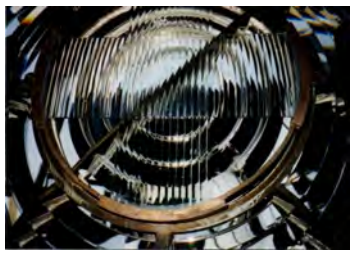


Fig. 5 Glass spreaders

7.6.2.3.2 Traditional Glass Optics

Traditional glass optics, either rotating or fixed, can continue to be used after automation/modernisation. The options available are:

- If it is a rotating optic then use stepper motor drive motors to replace standard electric motors and gearboxes.
- To avoid damage from the sun:
  - For drum lenses ensure that the lamp holder, lamp changer and wiring are properly shielded against the heat.
  - For rotating optics maintain rotation during the day.
- Mercury baths can be retained however a safe working procedure must be followed for the handling and cleaning of the mercury baths.

7.6.2.3.3 Fog Signals – Air Fog Signals

There is no alternative equipment that can provide the long-range fog signals. Trinity House have not been able to automate the traditional air fog signal equipment and as a result have been replaced with short-range electric signals. Fog signal buildings complete with the compressors, air receivers and trumpets have become museum pieces. If conserved them public demonstrations can be arranged.

Fig. 5 Air receivers and fog signal equipment

7.6.2.3.4 Fog Bell

Original carbon dioxide driven bells can be solarised using electric stepper motor drive and cam. An example of this can be seen at Trwyn Du Lighthouse in North Wales.

Fig. 6 Electric fog bell

7.6.2.3.5 Radio Direction finding Beacon

The system is no longer used but in the United Kingdom the transmitters are now used to transmit differential signals for GPS. Early examples of the equipment need to be kept for museum display.

7.6.2.3.6 Radar Beacons

Again equipment has developed over the years. Early examples should be retained for exhibit purposes.

7.6.2.3.7 Diesel Generators

Early models and types of engines should be retained. In many cases they can be exhibited along side air fog signal equipment.

7.6.3 Obsolete Equipment

Up to 20 years ago it was standard practice to remove and scrap all redundant equipment in some cases this included the large glass optics. Some optics were dismantled, crated and removed from site. They were then given on loan to museums for public display.

The problem was that when a station was being re engineered the old equipment was consider as obsolete, it looked old fashioned and no longer had any use and often was in the way of the new equipment being installed. At that time the design drawings, photographs and manuals still existed, but it is amazing how quickly these details are destroyed or lost.

How should the decision be made as to what is kept or scrapped?

Originally this was done on an informal basis left to the Engineer in charge of the project, often not even mentioned in the scheme. Cost of removal was not even considered and was lost under the heading "Clear site".

Today the profile of retaining artefacts has been raised to such an extent that a procedure has been included in Trinity House's handover document so that every redundant piece of equipment is properly considered to determine whether it is to be retained as an artefact, returned to stores for use as spares or for potential re-use, or just scrapped.

Looking outside some of the offshore lighthouses it was obvious that the sea was used in the past as a dumping place with the remains of broken glass battery cases, wire, engine flywheels and even cannons on the seabed.

The smaller items perhaps faired less well as, if they were attractive they fell pray of the souvenir hunter otherwise were scrapped. But again they tell a story and show a method and practice. It is too later to preserve a complete installation but perhaps somewhere sufficient components exist that would allow an exhibit to be assembled within a museum environment.

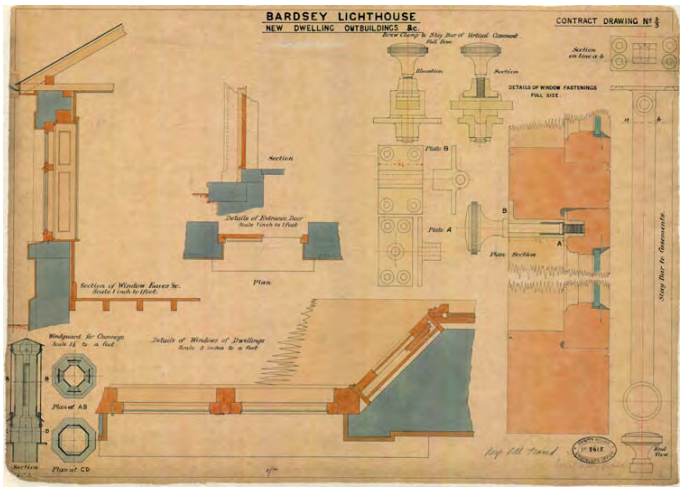


Fig. 7 Example of window furniture lost from many stations

Policy Statement.
It is the duty of every organisation to have a clear policy statement in place to detail how redundant equipment should be dealt with and a procedure to be followed avoiding the decision being left to the whim of an individual person who may have other interests.

7.6.4 Effect on Structures

Automation and re-engineering has led to the use of less space at the lighthouse properties. There is no need for family accommodation on mainland stations and the required day facilities for visiting personnel can easily be accommodated within the tower. On offshore rock stations, although accommodation was generally not so extensive, providing overnight accommodation for visiting personnel has still left some surplus accommodation.

The type of surplus accommodation can be divided into Living Accommodation and Equipment Space.

7.6.4.1 Living accommodation

Trinity House is most fortunate that the majority of lighthouse cottages are situated in easily assessable areas and are connected to the main services – electricity and water. Some properties were sold off in the past to private individuals as Freehold and Leasehold but in all cases problems have been experienced in the failure of the new occupants to maintain the properties to Trinity House's required standard. Unfortunately the corporate identity remains with the property and associates the service with a fall in standards!

Where the properties, and in some cases included the lighthouse tower, have been sold to a national organisation, such as the National Trust, it has not been a problem as they have maintained them to a high standard, as public attractions. However there is a limit to the number they want and can satisfactorily exploit.

Trinity House put together a business plan covering the development of visitor centres, focusing on the Lighthouse itself, and the public holiday letting of lighthouse cottages. This plan showed that it was economically viable, providing a financial return, yet retaining the properties in the Lighthouse estate. Work on implementing this is well underway with nine visitor centres up and running during 2001, all showing increasing visitor numbers, and the letting of cottages being introduced over the next two to three years. The handling of the hiring and the management of the day- to-day logistics of this latter operation have been put out to a third party specialising in letting holiday cottages.

Fig. 8 Pig sties at Anvil Point Lighthouse

The plan also allows for the adventurous use of some of the larger island sites where mains

facilities are not available. This may include the idea of specialist holidays, such as bird watching.

Lighthouse cottages have a particular character having been built substantially to withstand the elements with heavy wooden internal finishes. They are located at some of the most picturesque and environmentally interesting locations around the English and Welsh coastlines.

7.6.4.2 Equipment Space

This usually consists of redundant fog signal and engine rooms that were often separate buildings housing the equipment. Other rooms within the tower that have become surplus to needs have been cleared and used for storage. Most stations have outbuildings such as oil stores, pigsties and workshops. Some have explosive magazines dating from the days of explosive fog signals.

The way the majority of these buildings were dealt with in the past was for the equipment to be scrapped and the buildings demolished. The only reprieve for the building was if part of it continued to have a specific Service use, in which case the redundant equipment was pulled out and scrapped but the building kept.

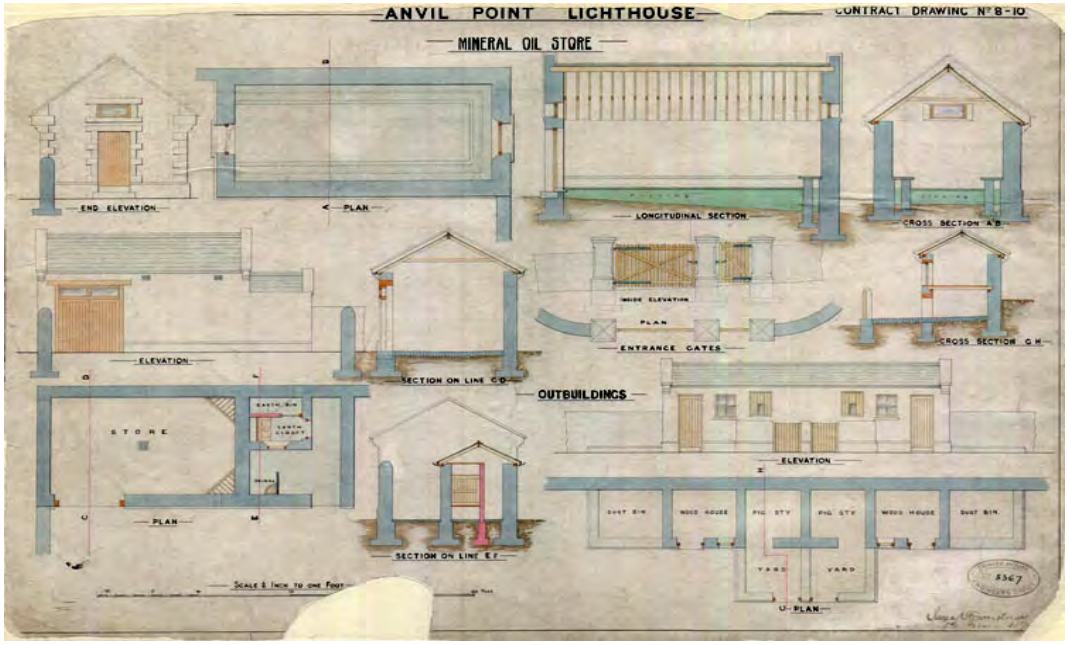


Fig. 9 The original plans of the Outbuildings at Anvil Point Lighthouse

Luckily most of the smaller buildings have been left untouched over the years and provide an insight into life on the stations in years gone by. It is difficult to persuade maintenance departments that these need to be maintained but luckily they have survived. However where the Lighthouse is listed then they fall “within the curtilage of

the building", usually taken to mean within the boundary walls, then it is a legal responsibility on the Service to maintain them. Once the conservation initiative had been realised then such buildings and equipment are retained.

Options available are:

7.6.4.2.1 Retain the building with the equipment in place as an exhibit

This is quite easy to do by mothballing the equipment and ensuring that the building is properly conditioned. This is not so easy to do on island sites and the cost of maintaining the exterior and interior will continue to be a burden for years to come.

Fig. 10 Moyes equipment, Hurst Point Lighthouse

An example of this is the Acetylene Accumulator House at Hurst Point Lighthouse, on the south coast of England, which still houses the Moyes acetylene generators, the last surviving example of the equipment in the United Kingdom. Drawing and operating instructions are included in Appendix 3. Twenty years ago the importance of the equipment was realised and it was proposed to move it to the Lighthouse Museum at Penzance. This was not going to be easy the site can only be reached using a passenger ferry. This was never carried out and so today the equipment remains in its original building which in this form was a functional part of the equipment design. The plan now is to open it to the public as part of a visitor initiative jointly with English Heritage who own the adjacent Hurst Castle. Such a joint venture may provide some income to offset the on-going maintenance costs. The building is Listed and as a result Trinity House has a legal responsibility to maintain it. Documentation concerning its operation has also survived but only because these were archived with the drawings.

In other cases complete air fog signal buildings have been made redundant through the introduction of short-range electric fog signals. The equipment has been retained, where possible, in working order so that they can be demonstrated to the public as their sound and loudness is quite unique and would otherwise be lost forever. Such demonstrations form part of the visitor attraction hopefully raising funds for the preservation of the equipment. The engine room at Nash Point Lighthouse, South Wales is fine example where the fog signal building and the equipment form part of the lighthouse attraction.

7.6.4.2.2 Retain the building for an alternative use after removal of equipment

If a building can still be used for a lighthouse use then it should be properly maintained and under go the minimum modifications to allow for its new use. At Nash Point Lighthouse a detached outbuilding in the yard adjacent to the tower, previously used as a workshop, has now been converted into an engine and control room for the station's mains standby alternator set. This is a small stone building with a slated pitch roof, sliding sash windows and entrance doors at both ends. Only minor internal modifications were required and it is now well suited to its new use.

Fig. 11 Workshop at Nash Point Lighthouse. Now an engine room.

7.6.4.2.3 Retain the Building

A decision may be made to retain the building for its historical value. For this reason many such buildings have survived as a store only later to be converted for a more useful purpose.

7.6.4.2.4 Demolish the building

As a last resort the building may have to be demolished due to its structural condition. This was common in the years gone by but today all the other alternatives must be exhausted. Once demolished it is final. Also in the UK the legal right for the existence of the building through the planning rules is lost. A structure that is listed as being of special architectural interest or importance cannot be demolished without the approval of the Local Authority and the Secretary of State.

7.6.5 Property Conservation

The maintenance of the Lighthouse estate is a significant task. Although at the time of each re-engineering project the light towers are brought up to standard through external painting, overhauling doors and windows and remedying any defects within the fabric of the building, on-going maintenance is essential. In days gone by there was a tendency to save costs by using building materials which were of an inferior standard to those previously used. Windows are a prime example where softwood woods were used instead of hardwood. The mistakes were soon realised, not only within the service but also within the building industry itself where the old skills and expertise have reappeared. Some changes such as replacing cast iron gutters with plastic reducing the need for painting and the problems of rust staining.

What is there to stop repairs being undertaken on a least cost basis using inferior material and unqualified operatives? The developments in modern building materials

have tended to cater for the installation by the non-skilled labour. Part of the "Do it yourself brigade"!

A decision has to be made in order to balance conservation against cost. The following need to be considered

- *The least cost route in the short term will most likely not be so in the long term.*
- *A responsibility exists to maintain the estate for future generations.*
- *A legal responsibility exists in the case of Listed building to maintain them in a satisfactory state of repair.*
- *Automation of lighthouses has removed the human presence on station capable of attending to minor defects before they become out of hand.*
- *Traditional aids to navigation are becoming less important and may well no longer be required in twenty years time.*

It must be recognised that some lighthouses figure more highly than others as being part of our heritage and are therefore of National importance and must be shared with the public. Reviewing the estate, a list of such stations has been identified, the most important is considered to be Lizard Lighthouse.

The lighthouse is situated on the Lizard headland, Southwest England and is the most southerly point of the British Isles. Its potential lies in it being a working lighthouse, its location, the size of the premises, its history, and the retained equipment on site. In order to record the station a conservation plan has been drawn up recording all features of historical and architectural interest. It also contains policy statements on repair and new works.

Fig. 12 – Lizard Lighthouse

The policy contains statements that can equally be applicable to the Service in general. The implications of adopting such policies Service wide should not be dismissed lightly as they will have a significant cost implication.

A full list of the Policies drawn for Lizard Lighthouse is contained in Appendix 1.

The other purpose of the Plan is to focus on the cultural significance of the lighthouse and the policies that need to be put in place to retain this. It also provides a detailed schedule of items of significance. This considers the main components of the structure under the following headings.

- Detailed area/location of component.
- Element - with description of any detail and loss of detail.
- Documentation, and its implications; indications for further research (further Information if not documented). Drawing numbers refer to Trinity House numbering.
- Significance:
  - [S1]= Exceptional significance.
  - [S2] = Considerable Significance.
  - [S3] = Some Significance.
  - [S4] = Little Significance.
  - [S-] = Detrimental to site.
- Condition and Vulnerability (and case for removal of detail if of negative significance).
- Policy proposed, and /or any proposals for conservation or re-presentation.

An example is included within Appendix 2.

It would seem logical to produce global polices and undertake the preparation of schedules of items of significance for the whole lighthouse estate. The degree to which this is done will be dictated by the architectural and historic importance of each station. It also allows a schedule of items to be drawn up as part of the planned maintenance of the station identifying what must and what would be “nice to do” if finances become available. This can also be linked into formal condition surveys of the individual properties, something not routinely done within Trinity House.

Global policies for service properties should cover at least the following headings: (Reference in brackets refers to Lizard Policies in Appendix 1).

- an effective approach to repair (Policy 2),
- the required standard of services installations and other minor works (Policy 3),
- surveying of property and the actioning of the necessary remedial work (Policy 5),
- the extent of site and boundaries (Policy 7),
- the standards of detailing in relation to the effects of the elements (Policy 9),
- Protection against fire (Policy 10),
- the presumption against the commissioning of new buildings on the site where existing can be used (Policy 12),
- the long term consequences of any proposed alterations (Policy 13),
- the identification of any activity or practice that should be avoided or continued (Policies 14,15,16…),

- consideration of all aspects of the natural environment in relation to the site and its surrounds (Policy 18),
- the survival of any surviving original details (Policy 21),
- identification of any existing activities that need to be maintained (Policies 21-25).

Although these policies are generic, some will inevitably become station specific.

7.6.6 Summary

The paper has attempted to set out the reasons for the decline in the need for Traditional Aids to Navigation and the resulting effects on the Lighthouse Estate. A duty exists to record and maintain the lighthouse heritage for future generations. Procedures and policies have to be produced to ensure this so that we can move away from the decisions being left to 'the whim of an individual person who may have other interests'.

Maintaining a lighthouse estate that now exceeds the requirements of the Service has significant financial implications and presents the need to look for alternative uses. The preparation of conservation plans for the significant historic lighthouses within the estate provides a basis for seeking heritage funding and recording the features and maintenance requirements. By adopting a series of generic conservation policies the process can be extended to the rest of the Service, something that should be the desire of any competent Lighthouse Authority.

The setting up of the I.A.L.A. Panel for the Preservation of Lighthouses, Aids to Navigation and Related Equipment of Historical Interest confirms that this is of international concern.

7.6.7 Appendix 1

Policy 1

The Lizard Lighthouse is to be conserved where ever possible either as a working lighthouse, which part of it currently remains, or conserved as it was at the point where it ceased to function fully as such, which might be taken as the date when keepers were withdrawn [1998].

Policy 2

All repairs are to be undertaken to a conservation specification utilising the original materials of construction unless a clear case to the contrary can be made. They shall be professionally designed, resourced and inspected by persons with appropriate building conservation experience and training, and executed by contractors with appropriate conservation skills.

Policy 3

All building services installation work shall be professionally, and carefully designed, specified and inspected, and resourced that the conservation implications of the intervention, however small scaled, are fully taken into account. In particular, all service runs, drilled holes and chases are to be agreed in advance

Policy 4

All future major or structural building work should be formally assessed following the thinking and policies set out in this plan

Policy 5

The Authority will continue to monitor the condition of this historic station on a regular basis to produce a written quinquennial condition survey and act where appropriate on its recommendations.

Policy 6

Specific management measures and adaptations will be made to maximise accessibility to as much of the station as is possible, for all persons including those with physical disabilities, within the constraints imposed by the safety and security requirements of the station (including any operational requirements), and unavoidable physical limitations to parts of the station (eg steps in the light towers).

Policy 7

The site area and the boundaries walls are to be maintained in their present (historic) form.

Policy 8

The Lighthouse Authority will seek to maintain, formally or informally, effective consultations with all the stakeholders for the Lizard Point area to ensure the maximum coordination of the objectives of the several organisations, owners and bodies involved.

Policy 9

To preserve this historic station from damage the highest standards of detailing against the weather should be adopted at this site including in the following areas:

- wind loads on roof structures;
- wind uplift on the roof coverings, ridges and flashings;
- securing and handling of windows and doors in extreme weather;
- regular checks on the structural integrity of exposed elements, especially:
    - chimneys.
    - lantern and wind vane.
- maintenance of lightning conductor system with extension to Dwellings. Reinstate;
- protection to W tower;
- condensation and humidity;
- reduction of risk of fire spread in strong winds.

Policy 10

The best fire prevention systems and advice should be procured in consultation with the Fire Service.

Policy 11

No further property is to be sold off or acquired without a full assessment in conjunction with the completed Conservation Plan for the station in question.

Policy 12

There will be a presumption against new buildings being commissioned on the lighthouse site where existing accommodation might be used instead.

Policy 13

Assessment of any proposed adaptation or alteration work to the site should look beyond any immediate effect to include an assessment of the impact of any possible further developments that might reasonably evolve from these changes.

Policy 14

Tenants and staff will adhere to the approved Trinity House colour scheme in all respects.

Policy 15

There will be a presumption against the fixing of signs to the exterior of building by either the Lighthouse Authority or tenants.

Policy 16

Avoid parking near light towers and control parking on site generally. Use boundary walls to the full to contain parking.

Policy 17

All options will be considered to maintain the in service use of traditional light/optic.

Policy 18

Attention will be paid to all aspects of the natural environment on and around the site, and best conservation practice in maintaining and enhancing it will be taken as a starting point in respect of the planning and execution of any alteration or maintenance work that might affect that environment. If the site merits it, an ecological audit of the site and/or surround areas may also be commissioned.

Policy 19

Everything will be done to maintain the two towers at the Lizard symmetrically as far as this can be done.

Policy 20

To maximize the possibility that their character will be retained, the dwellings should if possible remain in residential use, whether it be for custodial staff, local people or holiday accommodation.

Policy 21

Any work on the dwellings will ensure that any surviving original detail is retained in situ in some way and that in addition to this, it is used to help increase the legibility of the station (in terms of clarifying the two main phases of work).

Policy 22

The previous history of adaptation should if possible continue, viz the rear extensions, which are less formally composed, will continue to bear the brunt of necessary adaptations while the two storey S part of each dwelling remains as intact as possible

Policy 23

The Engine House should remain as it was intended, an Engine House

Policy 24

At least one of the exhibited engines will be kept in working order, to include the use of one of the historic circulating water tanks for cooling.

Policy 25

The 1897 foghorn will be kept in working order.

Conservation Plan for: The Lizard Lighthouse: Appendix 6: detailed schedule of significance

Ref No. in survey	Main component	Detailed area/location of component	Element with description of any detail, including any lost detail	Documentation, and its implications; indications for further research (further information if not documented). Drawing numbers refer to Trinity House numbering	Significance: [S1] = Exceptional significance [S2] = Considerable significance [S3] = Some significance [S4] = Little significance [S-] = Detrimental to site	Condition & Vulnerability (and case for removal of detail if of negative significance)	*Policy proposed, and/or any proposals for conservation or re-presentation*
2	**Dwellings**						
2.1.	**EXTERIOR ELEMENTS**						
2.1.1.	**Chimneys and high level features**						
2.1.1.1	**Chimneys: to main roof [First Floor]**	Construction, shape, size	Consistent design throughout. Probably of all-brick construction beneath render. Pronounced height. Lost detail (central recesses and chamfering) shown on original drawings and believed to be hidden beneath render. Granite caps.	Match in shape and size those shown on 1845 drawings [1103, 3097] except caps & pots. 1874 additional stacks have followed 1845 design. Relevant drawings of 1874 houses missing but current cap profile is as shown on another 1874 drawing (4486)	Chimneys a carefully considered component of both the 1845 & 1874 unified designs. Retention of form, height, proportions etc crucial [S1] to retention of original design ambitions and the strong character and silhouette of a unique landmark building.	Apparently good condition. No evidence of major rain penetration noted. Risk of loss of detail on re-rendering, and damage to caps etc in fixing aerials. Risk of loss of chimneys to conventional arguments about redundancy, damp etc	*The form and shape of chimneys are crucial to the retention of the original design and strong character and silhouette of this landmark building and must be retained. Adopt conservation remedies for managing any linked dampness discovered in the future*
				This suggests all caps were renewed by Douglass to unify design and improve weathering. Trinity House confirm lost detail lies beneath render [C Wortley, Penzance Depot, 1999]	Retention of chimneys leaves open options for future environmental management of station [heating, through ventilation, etc]		*Retention of original brick core desirable [S2], for archaeology value of retaining original material.*
					Granite caps represent typical lighthouse high quality detailing [S2] and are appropriate for a severely exposed site		*Record structure if re-rendered, and recreate missing recesses and chamfers in new render finish. Retain granite caps and repair any damaged sections like-for-like*
2.1.1.2	**Chimneys to main roof**	Finish	Bitumen paint on hard render. Ashlar lines [horizontally incised lines in render representing false stone courses] shown on original drawings appear to have been lost	1845 TH Dwgs 1103, 3097 indicate ashlar lines thus presumably intended to be rendered from outset. No 1874 drawings. One pre-1903 postcard shows brick coloured chimneys but this is probably artistic licence	Render may not be original but a rendered finish was probably always intended. Black tarred finish is a traditional lighthouse service detail and should be recreated, at least to offer a black finish from the distance. [S2]	Condition requires more detailed inspection.	*Retain render where possible: retain/recreate a black painted finish and ashlar lines. Consider more vapour permeable finish*
2.1.1.3	**Chimneys to main roof**	Pots	Mostly tall black glazed decorative clayware, probably C20 but to Victorian design. 2 iron pots to chimney between Dwellings 1 & 2 recently lost, believed to be unique TH design from last war/50s	TH Dwgs 1103, 3097 show simple clay pots no more than about 10" high. Similar pot shown on 1874 Engine House elevational drawing [4475] (1874 elevational drawings of dwellings missing). Current pots thus not original	Clay pots [S3] probably a C20 addition, but are sympathetic and reinforce the strong verticality of the tall chimneys. The recent loss of the iron pots is regrettable	Clayware pots require closer inspection.	*Clayware pots: retain for character. Iron pots were unique as a homegrown design, and consideration should be given to recreating them.*
2.1.1.4	**Chimneys: lost chimneys to rear [Ground Floor] roofs**	As shown on earlier photographs and drawings	Tall slender chimneys serving kitchens etc of original dwellings: now lost, often with chimney breast and support walls below removed also.	One per house shown in detail on George Burrell's 1845 drawing 1103, detail similar to main chimneys. No Douglass drawing found showing chimneys on his extensions but these shown in later photographs	[S3] Part of original scheme and if present would help legibility of original design viz. rear extensions represent the service areas of dwellings. Low siting means that they are not as visually dominant as First Floor chimneys	Chimneys lost but all details for reconstruction of 1845 chimneys [Dwellings 3, 4, 5] survive	*Consider reintroducing as part of adaption work of dwellings. It is accepted however that gains then made in terms of historic veracity and design legibility will need to be weighed against their likely lack of function in a modern adaption*

7.6.9 Appendix 3 – Details of the Moyes Patent 'Acetylite' Generators

Telegraphic Address:
"ACETYLENE," GLASGOW.
"CARBIDE," EDINBURGH.

DIRECTIONS

TELEPHONES:
GLASGOW—
Central, - - 1104 and 1106
WORKS, CATHCART—
Queen's Park, - - 212
EDINBURGH—
Central, - - - - 5774

. . FOR MANAGEMENT OF . .

MOYES' PATENT 'ACETYLITE' GENERATORS

Do not allow a Light in Generator House.
Do not examine Generator with a Light even when Bell is removed.

TO PUT GENERATOR OUT OF ACTION.

1. Raise hand wheel (this lowers starting rod inside of Generator).
2. Lift Lever Ball Crane to allow Gas from Generator to Holder.
3. Shut Cock between Generator and Holder to prevent Gas getting back to Generator.
4. Open Drip Cock under Generator.
5. Unscrew Fly Bolts and take off Cover of Generator.
6. TAKE OUT CARBIDE CHAMBER. If a quantity of Carbide is still unused it is unnecessary to remove same.
7. Open Sludge Cock on Front of Generator. This runs off all lime and water from inside of Generator.
8. Open Seal Cock every charge, as water in seal becomes foul.
9. Open Water Level Cock on Front of Generator.

TO CHARGE GENERATOR.

1. Wash out Generator through Bell neck with bucket or hose pipe (if no water supply is in Generator), till water comes clean through Sludge Cock.
2. Close Sludge Cock (No. 7) and Seal Cock (No. 8).
3. Fill Generator till water runs out at Water Level Cock (No. 9). Make certain that Inner Tank is full, as, if water is run into Seal, it will show at Level Cock before Inner Tank is filled.
4. Close Water Level Cock (No. 9) when water stops running. Put Carbide Chamber (No. 6.) in place and fill to top with Carbide after cleaning Valve and Seating. See that Valve is down properly on Seating. Soft soap washer on cover and screw down with fly bolts as tight as possible with fingers only. Shut Drip Cock (No. 4).

TO PUT INTO ACTION.

1. Lower Hand Wheel slowly. This raises Starting Rod and allows Carbide to drop into water, thus generating Gas and raising dome.
2. Open Drip Cock (No. 4) for a few seconds to allow air or water to escape.
3. Open Cock between Generator and Holder (No 3).
4. Lift Lever Ball Crane (No. 2), and see that Gas passes freely from Generator to Holder.
5. Wash out Generator House and clean down Machines. It is essential that the Plant be kept clean, and all working parts must be constantly lubricated. Open all Drip Cocks on Generator and Holder for a few seconds after Generator has been re-charged.

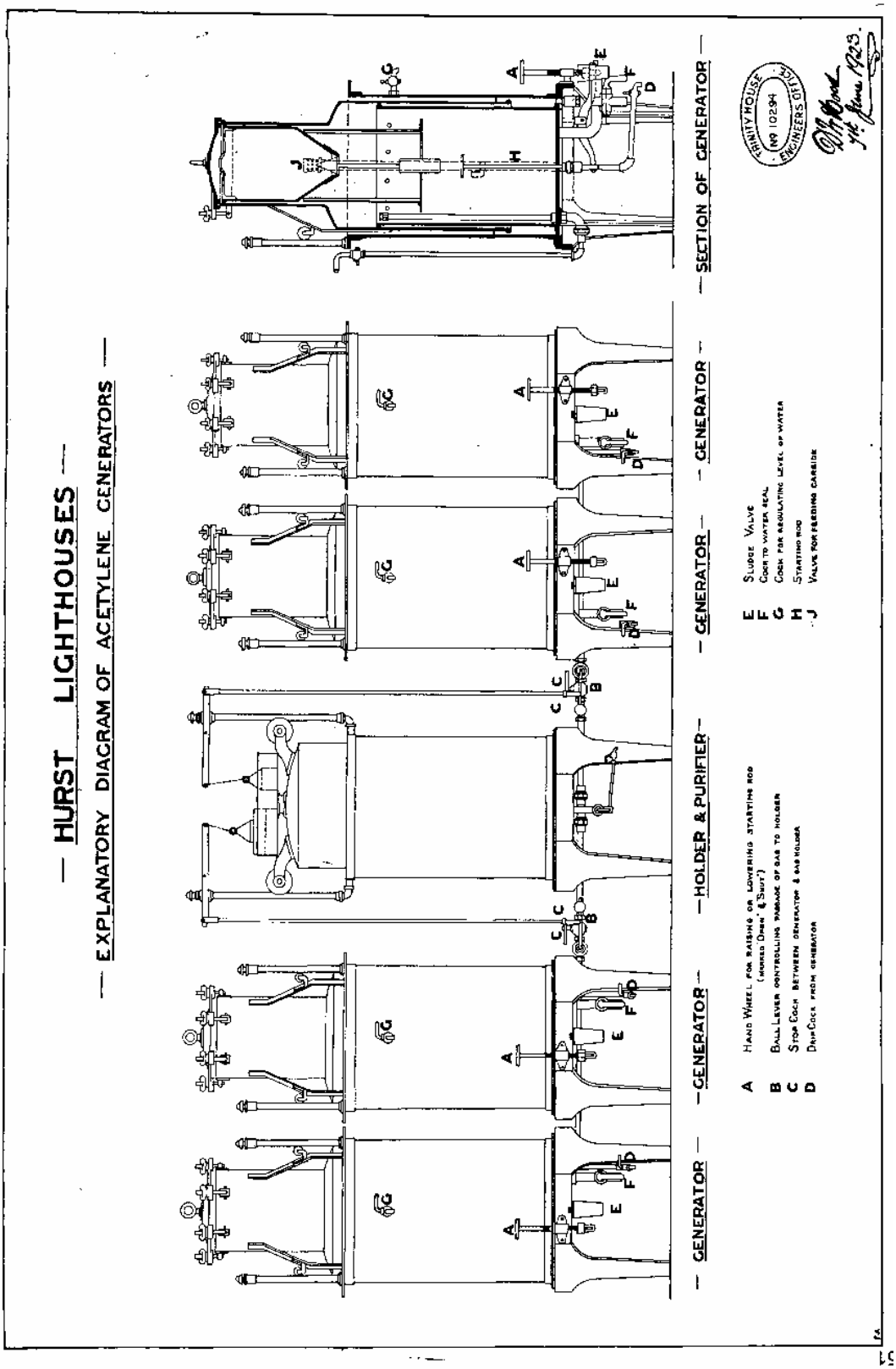
SHOULD PLANT FREEZE, THAW WITH HOT WATER ONLY.

WM. MOYES & SONS,

ACETYLENE ENGINEERS,

Head Office and Showrooms, 142 WATERLOO STREET, GLASGOW.

Works: CATHCART. Branch Carbide Store, 23 HOPE CRESCENT, EDINBURGH.


— HURST LIGHTHOUSES —
— EXPLANATORY DIAGRAM OF ACETYLENE GENERATORS —
— GENERATOR — — GENERATOR — — HOLDER & PURIFIER — — GENERATOR — — GENERATOR — — SECTION OF GENERATOR —
A Hand Wheel for raising or lowering starting rod (marked Open & Shut)
B Ball Lever controlling passage of gas to holder
C Stop Cock between generator & gas holder
D Drip Cock from generator
E Sludge Valve
F Cock to water seal
G Cock for regulating level of water
H Starting rod
J Valve for feeding carbide
TRINITY HOUSE (No 10294) ENGINEERS OFFICE
June 1923.

7.6.10 Definitions

The following word definitions have been used for the purposes of this paper:

Freehold	A property where the owner of the property also owns the land on which it stands.
Leasehold	A property where the occupier of the property does not own the land on which it stands.
Listed	A building that has been placed by the Local Authority on the list of buildings, as being of special Architectural or historic interest.
Automation	It is the process of automating a Lighthouse after which the lighthouse keepers are removed.

7.6.11 Bibliography

Conservation Plan for The Lizard Lighthouse

Prepared by: Frans Nicholas RIBA Chartered Architects & Historic Buildings Consultants

Trinity House Lighthouse Service - Milestones in Lighthouse Engineering

By Ebbe Almqvist & Kenneth Sutton-Jones

Published by Pharos Marine Ltd/Automatic Power Inc.

Lighthouses & Maritime Aids of the World

By Kenneth Sutton-Jones

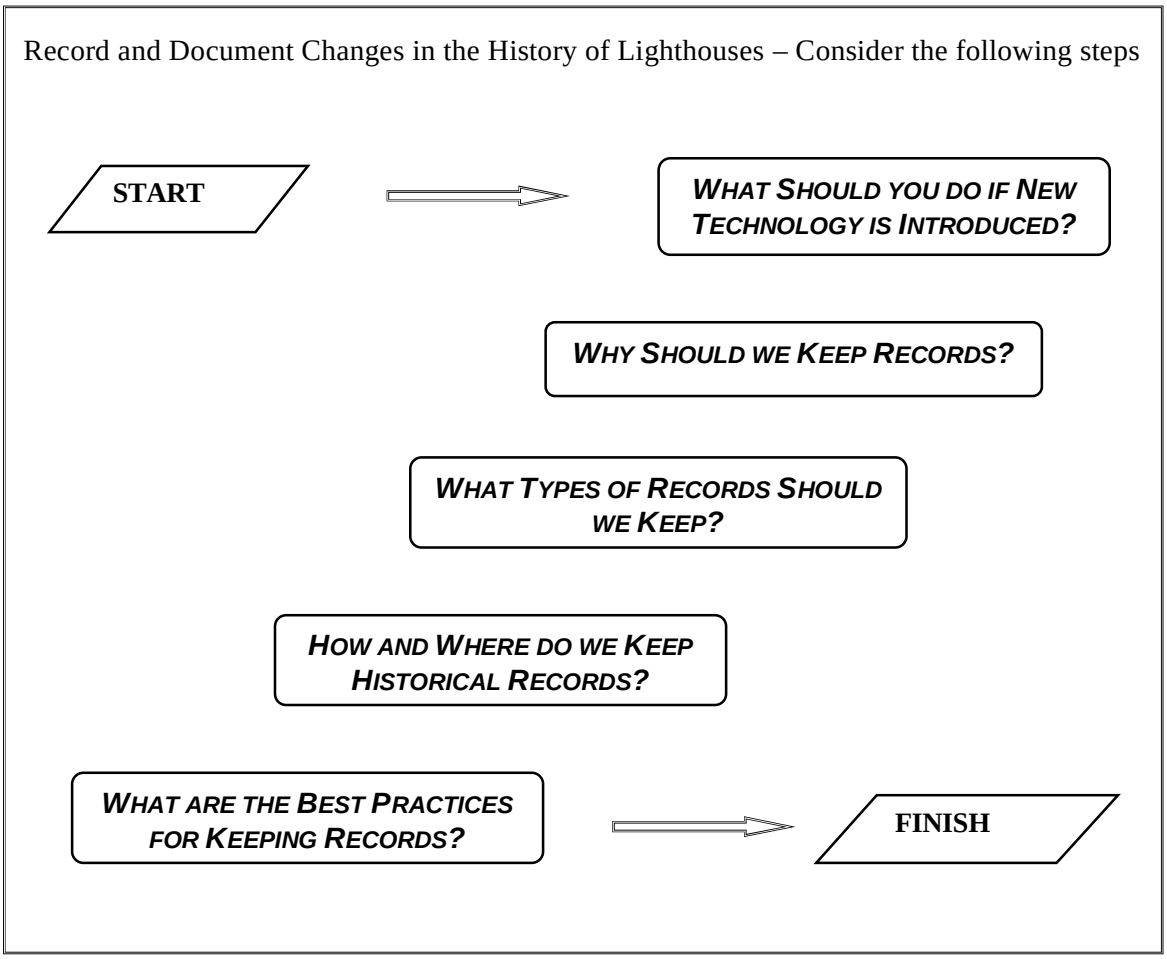
Published by B & T Publications

8. RECORD AND DOCUMENT CHANGES IN THE HISTORY OF LIGHTHOUSES

Currently, maritime authorities are heavily involved in restructuring, relocation to new premises, down-sizing and focussing primarily on future technological changes to their programmes and services. As a result, valuable historical documents which represent a wealth of information for present and future generations are disappearing and in some cases are lost forever.

There are many factors, which contribute to this loss. In particular the pressures to move into smaller premises as well as limited or no staff dedicated to recording and maintaining archives.

The following is intended to form a basis for the development and implementation of a process to assess the value of, organise, and make available documents of historical importance.



8.1 WHAT SHOULD WE DO IF NEW TECHNOLOGY IS INTRODUCED?

There are two aspects to the introduction of new technology. Firstly, new equipment can be added to enhance the lighthouse as a navigational aid, or secondly existing equipment can be replaced with new technology. Both of these situations require a similar approach.

8.1.1 Enhancements to the lighthouse

- Where practicable, produce digital photographic record of changes being made but at a minimum, produce a paper version.
- Produce an inventory of new equipment that has been installed.
- Preserve original drawings and produce updated drawings.
- Archive all material.

For example *- Adding a DGPS antennae on a lighthouse*

8.1.2 Replacing existing equipment.

- Where practicable, produce digital photographic record of changes being made but at a minimum, produce a paper version.
- Produce an inventory of new equipment that has been installed.

For example –
Replacing traditional lenses as happened at Mull of Galloway Lighthouse during automation. The original lens and mechanism was removed and replaced with a gearless pedestal with lamp array on a new aluminium floor and an ML300 was fitted as an emergency standby light.

- Preserve original drawings and produce updated drawings.
- Archive all material.
- Once equipment is removed, consideration must be given to appropriate storage (refer to Chapter 7, Managing the Consequences of Technical Change).

8.2 WHY SHOULD WE KEEP RECORDS?

In some countries it is a legal requirement to maintain records of an official nature, whereas in others it remains at the discretion of the organisation. It is the duty of a responsible organisation to have a policy on document retention.

8.2.1 Historical research purposes

- To retain an important part of maritime history for future generations.
- To have accurate accounts of events, original designs, equipment, living conditions, historical figures, etc.
- Education - to enhance the awareness of current and future generations.
- To provide reference information in response to public enquiries.

8.2.2 Conservation / Preservation

- To retain documents (e.g. log books, drawings, correspondence, etc.).
- To have an accurate record of construction materials for renovation / restoration.
- To support heritage organisations in the designation and protection process.

8.2.3 Maritime Authorities existing requirements

- For maintenance purposes.
- To learn from past experiences (not to make the same mistakes).
- For personnel training.
- For environmental assessment purposes, to establish existence and location of hazardous materials.
- For the preparation and updating of site Health and Safety File.

For example –
Location of services and hazardous materials e.g. redundant paraffin tanks displayed on site at Kullen Lighthouse, Sweden may indicate the possibility of paraffin contamination on site

- For legal reasons in future with regard to design, construction materials, etc.
- For property title searches in order to confirm boundaries and ownership of the property.

8.2.4 Alternative use

For example –
The use of old drawings and other unique documents, which represent significant milestones in history.

- For marketing as a tourism product.
- For branding and merchandising.
- To keep historical links with local community.
- To retain or return to the original character of the site.
- To assist maritime authorities in the divestiture process.

8.3 WHAT TYPES OF RECORDS EXIST WHICH MAY CONTAIN RELEVANT INFORMATION?

Different countries have different systems in place for retaining records and it may be impracticable to store all historical records. The following list of record types is not exhaustive.

- Log books – Light keeper's records.
- Visitors' books - buildings, vessels, property.
- Sound Records:
  - Equipment (fog signals),
  - People Stories (Audio tapes, CD),
  - Records,
  - Radio Interviews, Reports.
- Visual Records:
  - Video tapes,
  - Films (motion),
  - Photographs (print and negative),
  - Transparencies,
  - Paintings,
  - Media files (TV interviews, programmes),
  - Video Cams.
- Correspondence (personal or official).
- Personnel records.
- Drawings and Engravings.
- Books (historical, technical, auto biographies, keeper's diary).
- Newspaper clippings.
- Manuals (operations, materials and supplies).

Lightkeepers on parade at Bass Rock, Scotland circa 1925

Take note of Data Protection / Freedom of Information Legislation

- Instructions (how to operate equipment, what to report, etc.).
- Standing orders (light keeper instructions).
- Administrative records (invoices, ledgers).
- Minutes of meetings (Where strategic decisions were taken).

8.4 HOW AND WHERE DO WE KEEP HISTORICAL RECORDS?

8.4.1 The location of archive material for different countries varies.

- National archives.
- Regional\Local archives.
- Maritime Authority archives (national and local).
- Museums / Libraries.
- Heritage Authorities e.g. English Heritage.
- Associations.
- Private collections.
- Manufacturers.
- Media industry archives (newspapers, TV, etc.).

The best climatic conditions for different formats should be determined before storage is agreed.

8.4.2 Format used to keep these records

Care must be exercised when deciding which media is most suited to the long-term storage of particular information. Changing hardware and software technology should be monitored to ensure appropriate improvements are utilised. Experience has shown that the new technology does not always meet manufacturer's claims and new systems should be treated with caution.

- Original documents.
- Paper copies.
- Plastic film.
- Micro film.
- Tapes (video, audio, etc.).
- CD Rom.
- Multimedia.

Original documents should not be used on a daily basis. Only copies should be used.

8.5 WHAT ARE THE BEST PRACTICES FOR KEEPING RECORDS?

- Identify an appropriate and secure storage facility with appropriate environmental considerations for the type of data being stored.
- Determine appropriate laws for archiving historical information in your country.
- Seek advice from professional archivists.
- During office re-locations pay particular attention to preserving historical data.
- Seek advice before destroying previous methods of storage of information.
- Carefully consider your government record retention policies, as they may not be consistent with preserving historical records.
- As plans are produced electronically and retention dates highlighted, one must pay particular attention to the possibility of losing valuable information. Once that retention date is reached (hard copies of original documents need to be protected).
- An appropriate cataloguing and indexing system needs to be developed.
- Consider adjusting archiving system as new technologies for storing data are produced. (e.g. DVD systems, digital systems etc.)
- Original drawings should not be used on a day to day basis. Original drawings should be copied and archived, and the copies used as regular working documents.

*Refer to local websites similar to:*www.pro.gov.uk*, which provides valuable reference information Where available, use International Standards*

8.6 ANNEX - CHECK LIST

The following provides an aid to check that all points have been considered.

Items that have to be Considered	Is Item Applicable? Yes/No	Comments
What should we do if new technology is introduced?		
Digital Photographic Record (before and after)		
Inventory of New Equipment		
Preserve Original Drawings		
Update Existing Drawings		
Produce paper of digitised material if relevant		
Archive material in accordance with best practises		
Why should we keep records?		
Is there a legal requirement?		
Have you assessed all criteria noted in section 2?		
What types of records exist which may contain relevant information?		
Have you confirmed all types of records as noted in section 3?		
How and where do we keep historical records?		
Note locations in section 4		
Have you considered other possible areas unique to your location?		
Are you aware of your country's laws in regards to archiving historical information?		
What are the best practices for keeping records?		
Have you noted all points raised in section 5?		
Consider local websites for reference information		

9. METHODOLOGY FOR CASE STUDY EVALUATION

The intent of this chapter is to provide a template for easy reference in evaluating the potential success or failure of a project. It should be noted that this is not an exhaustive list of questions but should provide a reasonable methodology for assessment.

9.1 PROJECT DESCRIPTION

Project Title and Description (Aim)

Who are the Partners - directly involved (if any)

Who are the principal stakeholders (interested parties), and were they involved?

Outline of the Agreement

What were the principal challenges in the project?

Did the project have the support of the community, heritage bodies and the maritime administration?

9.2 TECHNICAL MERIT

Were technical experts required e.g. architect, historian, etc? (Provide details)

Were technical experts effective (describe)

What were the infrastructure challenges and how were they addressed (power, water, sewerage, access etc.)?

Were physical alterations made and are they reversible?

9.3 OPERATIONAL CONSIDERATIONS

What were the security concerns in regards to the property and how were they addressed?

Has the original lighthouse estate been altered?

Is the lighthouse still in use as an Aid to Navigation and what impact has this had on the project?

If the lighthouse is an operational AtoN has the project had an impact on this service?

What were the accessibility problems and how were they addressed?

9.4 FINANCIAL OVERVIEW

Was a business case prepared?

Is the project economically viable?

Are running costs allowed for and what are they?

Does liability coverage exist (insurance)?

What is the economic impact on the local community

Were capital funds a major issue, if so how was this overcome?

9.5 HEALTH AND SAFETY

Was there a Health and Safety Risk Assessment conducted, what problems were identified and how were they addressed?

Was an Environmental Impact Assessment carried out (including site contamination as well as the impact on the environment of the project)? What problems were identified and how were they addressed?

Was an Emergency Response assessment conducted and a plan prepared?

9.6 CONSERVATION

In the project evaluation what heritage issues were identified?

Were heritage bodies consulted and what their requirements?

Did you have access to all necessary historical documentation e.g. plan drawings, equipment specifications etc?

How were the heritage issues addressed?

Was there any impact from alterations?

Was documentation retained related to all alterations?

Has the historical or cultural significance of the site been affected (negative or positive)?

What degree of restoration was required?

9.7 CONCLUSION

Are there links to other tourism or heritage projects in the area, and if so, what has been the impact?

What were the successes and failures of the project?

What changes could have been made to make the project more successful?

Could problem areas been solved differently?

What are the threats and possible opportunities for the future of this project?