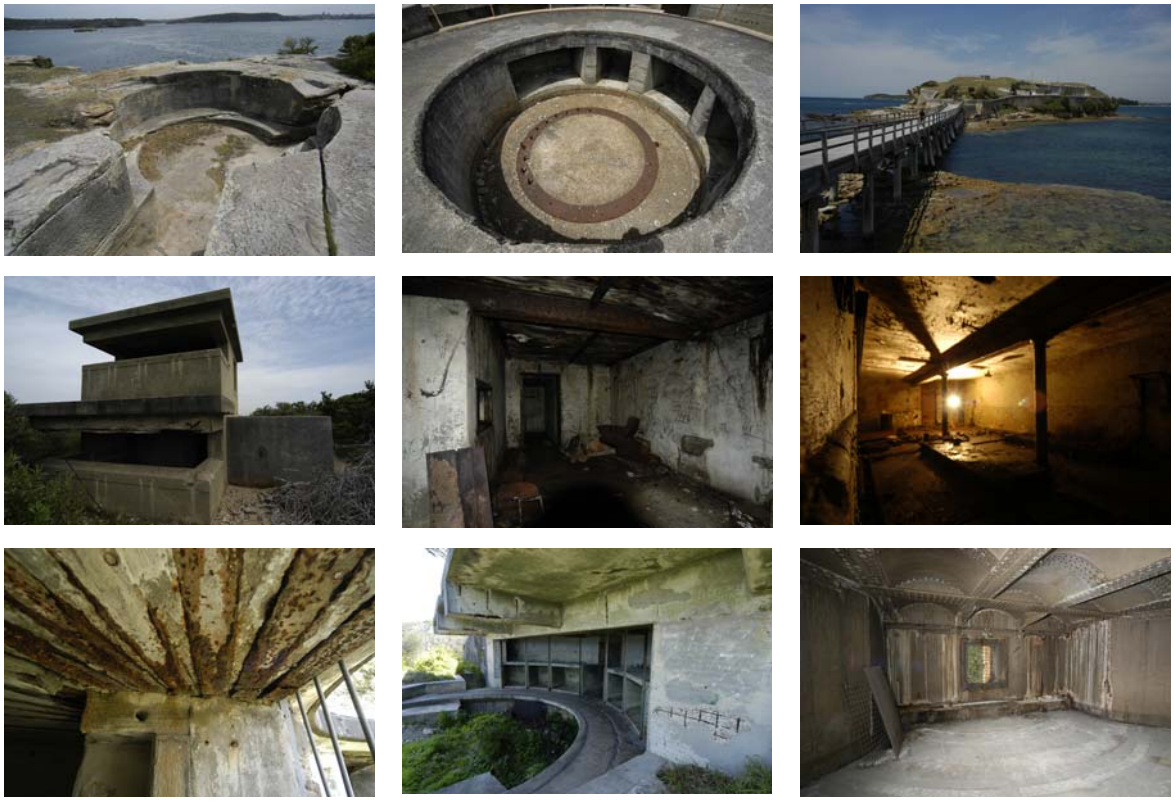
The NPWS Fortifications
of
Sydney Harbour and Botany Bay

A Strategic Plan

prepared for

National Parks + Wildlife Service



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Executive Summary

This strategic overview of the fortifications managed by NPWS has identified that:

1 All of the sites within the study area are of State level heritage significance, the sites collectively are of State and National heritage significance and a number of key sites are of individual National heritage significance. All sites are of local heritage significance within their immediate setting, as the sites are of State significance, local values have not generally been addressed.

2 The core sites within the fortification sites are Middle Head (inner and outer), Georges Head except the WWII sites, Bradley's Head, South Head sites above the cliff top, Steele Point, Henry Head and Bare Island. These are sites of high significance but also with potential for interpretation, visitation and which demonstrate the key aspects of the story of how Sydney and Australia was fortified.

3 There is a need across the range of sites for some relative grading and assessment to assist in setting out policy that needs to address specific issues and sites with priorities that at least in part are based on grades of significance.

4 It is not feasible either financially or within the management ability of NPWS to manage all fortification sites to achieve their full potential in terms of conservation, maintenance, access or interpretation.

5 Despite excellent work in both day to day management and numerous reports and studies the sites as a whole are not being appropriately managed in relation to their high level of significance or their potential.

6 Despite conservation work being undertaken, often of a high standard, there is a high risk of the loss of some structures and places in the group. There is also continual deterioration of finishes and elements in many structures that will in time lead to their loss.

7 Conservation work, even though usually well done, appears haphazard across the sites. It is clear that when conservation takes place it is organised and usually based on research and documentation.

8 Maintenance programs are also haphazard, if they take place, and rely largely on the interest or skill of the local ranger or other local staff. Fortunately there are a number of skilled and passionately interested NPWS staff that have maintained sites as they are able to within their broader duties. There is no management system to ensure that this continues.

9 There has been an unbalanced approach to sites across the region with several sites having extensive research and reports written and others having no formal assessments or analysis. This appears to relate to an interest in particular structures, particularly the Georges Head forts, rather than a strategic approach to asset management.

10 There is a current program of conservation management plans being prepared to address gaps in knowledge, however many of the plans in existence are now very old and do not address current requirements for CMP's. Despite this the quality of a number of the CMP's, particularly those prepared by D Gojak, is excellent with a depth of knowledge and information that is invaluable in moving forward.

11 Apart from the work of Gojak there is no consistency in approach to preparing management plans and no overall consistent approach to site identification, relative

values or fabric analysis. It is very difficult to compare sites across the portfolio despite the large number of reports written.

12 There are numerous condition reports, structural assessments, materials studies, etc. particularly for sites at Middle Head and Georges Head. These reports do not necessarily agree or recommend the same works or outcomes. Often reports propose invasive solutions that should be treated with caution. Some reports examined in this study appear not to be reliable or helpful. There is also no common repository for information and no re-use of material from one site to another where issues are common. Consequently there is considerable repetition of material and methods between studies.

13 There is no overall thematic background history discovered (although one may exist) but there are excellent site histories that place specific sites within the context of the development of fortifications. Consequently it is difficult to understand the development of Sydney's fortifications as a whole. It is also interesting that most published material on fortifications focuses on ordnance rather than structures. There is relatively little ordnance remaining but almost all of the fort structures survive in some form.

14 There is limited accurate mapping of sites available and no consistent approach to site mapping or recording. Drawings and plans appear in various reports but are difficult to locate as originals.

15 It appears that property files are not generally maintained in terms of working files for each property or major feature with records of work and inspections.

16 The security of some sites, particularly remote or obscure sites, is often compromised with break-ins, vandalism, etc. This is despite the installation of screens, locks and barriers.

17 There appears to be no consistent approach to risk assessment or risk management across sites. This is seen in variations in approach to provision of fencing or railings, variations in what is accessible, etc.

18 Public access is available to almost all sites but very few sites have well managed access that allows visitors to explore below ground areas with safety or access sites in a safe and intentional way. There is much of interest and appeal that is not utilised in terms of public access.

19 Organised tours and access has taken place but is now minimal and is dependant on staffing, the condition of structures and assessed risks by local staff. There is no advertised clear pattern of tours or access.

20 Site interpretation is minimal and on most sites does not occur. The often complex but interesting evolution of sites is not understood and most visitors (unless undertaking a tour) although inspired by what is seen and discovered leave, without learning about the role of fortifications in Sydney and the fascinating history attached to each place. A key part of the history of each site is how it fitted into the overall fortification of the Harbour/Botany Bay at the time it was built and how it linked to other sites, often of the same design.

21 There is little cross promotion of sites within NPWS management or awareness that other sites exist if a visitor visits a single site but has an interest in the broader group of fortifications.

22 There is no printed or published material available on fortifications either as free material or for sale at sites.

23 There are no obvious links between NPWS sites and other major fortifications such as North Fort and Georges Heights.

24 There is no co-ordinated or strategic approach to funding of works at fortification sites. Various funding applications have been and are being made for specific works to and around the sites but it does not appear to relate to a strategic plan.

Constraints

The broad strategy proposed for the fortifications is based on the following constraints:

1 The ability to fund works and programs will effectively limit the extent of programs proposed. While the fortifications are of very high significance, there are also other properties managed by NPWS that also require significant funding and which will compete over time for available funds. Consequently large-scale programs of work across the portfolio of properties are not proposed.

2 Nearly all of the works and policies proposed will require staff commitment and allocation. This will also affect funding.

3 The sites are spread and the conservation, maintenance and interpretation needs are high. Apart from very urgent works required to stabilise sites and elements the policies focus on key sites as a priority.

4 Items of identified high risk to visitors and staff are a priority.

5 Proposals need to align with broader NPWS policy related to the use and management of National Parks through the Plan of Management for Sydney Harbour.

6 As all sites are of State Heritage Significance or of higher value, the minimum standards of maintenance and repair as well as annual reporting under the NSW Heritage Act apply and need to be managed as a priority.

Strategies and Recommendations

This section provides a short summary of the strategies discussed throughout the report. The strategies proposed, with a rating of priority are:

Strategic Direction

1 Recognise that the sites comprising the fortifications of Sydney that are managed by NPWS are of exceptional heritage value to Sydney, NSW and Australia and that they should be managed to achieve their potential as part of the unique setting of the Harbour and Botany Bay. HIGH

2 Recognise that the number of sites, the extent of the features within each site and their high conservation and management needs will limit the amount of work that can be undertaken and agree on the following priorities across all sites: HIGH

   1 Secure all sites to the levels required to prevent unsafe access.

   2 Remove unacceptable OH+S risks as identified in this report and through more detailed later assessments.

   3 Undertake urgent stabilisation works (or undertake partial removal of elements) where there are risks of collapse or failure.

4 Establish site monitoring and reporting to all sites.

5 Implement a maintenance plan for each site.

3 Focus major conservation works, upgrade, interpretation programs, marketing and funding applications at Bare Island and Middle/ Georges Head sites in the immediate to medium term future. Only develop further programs when these sites are operational and being successfully managed. HIGH

Key Sites Approach

1 At Bare Island investigate potential commercial activity to support and assist the site (that is consistent with the plan of management). Re-establish tours at times to be determined based on need and time of year. Investigate value-adding tours with activities such as diving on the island, potentially staying on the island, night tours, etc. as part of a longer-term strategy. Develop the site as a core fortification site within the Sydney area. HIGH

3 At Middle/Georges Head develop a linked, self guided tour and managed guided tours that extend from the NPWS offices at Middle Head to the inner fortifications including the below ground areas, the outer fortifications, the defensive ditch, the 1801 fort, past the Obelisk Point WWII features, through the casemates possibly terminating at the Chowder Bay site (not NPWS ownership). Connect sites with a new walkway/track (using existing routes where possible) that provides safe and managed access to sites selected for access. Provide interpretation en route. Link the tour to natural values, tourism etc. HIGH

4 Develop a marketing strategy for the sites, for public access and for tourism to raise visitation numbers and to provide support facilities and activities.

5 Programs should focus on providing enhanced public access, safety, interpretation linked to initial conservation works where required. HIGH

6 Focus on providing organised tours that take advantage of the fortifications and the spectacular locations to promote NPWS values both built and natural. HIGH

7 Provide well designed and presented written material at these two sites with clear identification of sites, access routes, history, resources available to allow for self-guided tours as well as organised tours. HIGH

8 Investigate publishing material on the sites for sale. LOW

Management, Reports and Planning

1 Consolidate and index all reports and written work related to the fortification sites. HIGH

2 Establish a central repository for reports with copies in relevant local offices. MEDIUM

3	Undertake a review of all plans and reports more than three years old, commencing with older plans and documents to assess their appropriateness for current use. Establish a review program for documents that require updating.	MEDIUM
4	Establish a template for future plans and upgrades to ensure consistency of approach and information provided.	LOW
5	Appoint a staff member to have responsibility for the overall oversight of the fortifications, reports and works programs so that all the sites are considered as a group.	HIGH
6	Commission a thematic history, with a view to publication, covering the whole of the defence setting of Sydney.	MEDIUM
7	Consolidate data sheets for each element of each site on a common data base with updated information. Use this as the basis for future works and monitoring.	MEDIUM
8	Consolidate all known heritage listings and citations related to the sites.	MEDIUM
9	Establish a common approach to the assessment of significance across all sites.	HIGH
10	Extract detailed advice and recommendations on conservation and maintenance from the various reports and studies, review and consolidate into the database of property files.	MEDIUM
11	Prepare a review of written material at each site (this has been undertaken at one site) to allow comparison of work already undertaken prior to undertaking further reports and studies. This will also allow varying recommendations to be assessed.	HIGH
12	Update the HHIMS register for all of the fortification sites. Provide clear site and feature identification and mapping.	HIGH
13	Establish a conservation works program across all sites. Identify common issues, look for economies of scale in addressing specific and detailed problems. Stage the works based on priorities but also strategic policies. Initially address urgent stabilisation and make-safe works to all sites.	HIGH
14	Establish an annual maintenance program across all sites.	HIGH
15	Establish a monitoring program and annual reporting system across all sites.	HIGH
16	Undertake specific staff training for staff involved in managing fortification and built heritage sites.	HIGH
17	Provide higher levels of security to ‘at-risk’ sites as a matter of urgency.	HIGH
18	Approaches to OH+S issues and risk management need to be clearly articulated to achieve a consistent approach across the sites and to ensure that NPWS has clearly set out the basis of risk management for the fortifications which are sites that have potentially high visitation and which are in often difficult locations.	HIGH

Finance

1	Establish budgets to undertake the above programs.	HIGH
2	Develop an overall package of works, access and interpretation and seek special funding to undertake works of national significance at the two key sites.	HIGH
3	Develop a strategic approach to government to seek major works funding for key sites linked to other government strategies for tourism, etc.	HIGH
4	Identify works that can be undertaken without significant additional funding, in particular maintenance, security and monitoring and commence immediately.	HIGH

Introduction

This study has been commissioned to provide a strategic overview of the various structures that make up the widespread collection of fortification sites around Sydney and Botany Bay that are under the control of NPWS. This group of sites do not form the complete fortifications for Sydney with sites also being controlled by the Sydney Harbour Federation Trust, Sydney Harbour Foreshore Authority, the Department of Defence and several in private ownership. Also Fort Denison, owned and managed by NPWS, has been excluded from the study as it has specific management policies that are well established. It is an iconic site and would clearly be one of the locations of National significance as set out in this report.

The brief is also selective in that it does not include buildings on fortification sites that are not part of the actual fortification. It does however cover a very wide range of site types both above and below ground and allows for sites that could not be seen or located but which are known.

It is important to understand that the scope of the study is strategic and not detailed. While many of the sites visited have detailed issues to address the focus of the study is the management of the whole set of sites, establishing priorities for a range of areas and developing a set of recommendations that can be achieved within the framework of NPWS ownership and management. Consequently the main document does not consider each site separately but does consider each site within the context of the group.

Figures i – ii show the location of the sites around Sydney and the more detailed site plans of each site are included in the appendices. It is noted that there is not a comprehensive set of site plans or drawings across all sites and several sites have very basic site plans.

Background Material

A large amount of written material exists on the fortifications within the study area in the form of overall studies of fortifications, conservation management plans, maintenance reports, historical studies and undergraduate and postgraduate theses including several studies that are currently under preparation for Bare Island and South Head. Review of these documents also reveals that several sites have attracted extensive study while other sites have minimal research. There is also a large time frame in which reports have been prepared with a number dating from the 1980 period.

The material in these reports has formed much of the background material for this study. Of particular importance are studies prepared by Dennis Gojak related to Middle Head and Bare Island that provide a good overall history for the whole of the fortifications. These documents with the various site listings have been used as the basis for the historical background for this study.

While the documents available for each site have been used as background, most are not directly applicable to this study as they are too detailed or do not address the strategic or policy areas. However it is acknowledged that there is much valuable information contained in the reports and that a thorough and detailed review should be undertaken of all documents prior to future works being undertaken on the various sites.

There are also a number of journal articles on the history of fortifications in NSW and Australia that provide a sound background to understand the broader development of fortifications in the colonies and later Australia. Several of these have been used to provide context for the fortifications under study.

There is also an extensive amount of material on ordnance although relatively little survives and less survives in location or within NPWS ownership. Again this material is generally well-researched and detailed. Apart from general policy on ordnance as movable heritage this area is not addressed in this study that is principally site and fabric based.

It is worth comment, again by way of background, that given the obvious great interest in fortifications from both special interest groups and the general community that there is so little overall material available and, apart from several well-researched sites, so little overall knowledge of some of these places. This appears to relate at least in part to their former strategic nature and the poor records kept.

Limitations

This study is limited by the following factors:

- not all sites were accessible and some could only be viewed externally or from a distance
- each site has only been visited once, this does not allow for detailed assessments to be made of the various site components (although several sites required several visits due to their complexity)
- contextual study is limited to existing material within available reports
- no original research has been undertaken, all material relies on existing written sources or site observation.

Methodology

The study methodology has developed as the project has progressed. Initially it was proposed to undertake site visits and to prepare data sheets for each site or parts of a site with detailed information. As the site visits have been undertaken, reports reviewed and material assembled for this report it has become clear that the data sheets are complex as they have to address multiple layers of development over large sites and that presenting material in comparative tables is a mort useful way to provide an overview and strategic direction for management of the sites. While the data sheets are useful it has been determined that the main document needs to consider strategic issues as a priority and then to look at individual sites in more detail.

Consequently the methodology adopted is:

1 Investigate the background history of the sites based on existing material to determine the relative value of the various elements within the study area. Prepare a schedule of relative significance.

2 Undertake site visits of all fortifications within the study area to review:
   - significance
   - their overall condition
   - their setting and landscape surrounds
   - their accessibility
   - their ability to be managed
   - common maintenance issues
   - specific maintenance issues
   - OH+S issues

- security issues
- potential for public access
- potential for interpretation

3 Liaise with PWG staff to identify any known maintenance, risk or other issues is addition to those identified in this report.

4 Prepare a comparative analysis of the sites based on the above criteria

5 Develop strategic policies for the fortifications as a whole.

6 Develop policies and strategies for each major site group.

Sites Included in the Study

The following sites are the sites addressed in this study. They are sub-divided into broad elements. The site plans in the appendices identify the known elements on each site (for those for which plans exist), some using a numbering system developed by NPWS. For many of the identified sites there are data sheets which are part of the extensive collection of reports held by NPWS.

BARE ISLAND	- access bridge
	- 1877-1886 and later fortifications as a whole on the island
	- 1889 barracks building
BRADLEY'S HEAD	- 1839 harbour front fortifications
	- 1870s fortifications including rifle post wall
	- WWII lookout and anti-aircraft gun emplacement
CAPE BANKS	- c1940 above ground remains – 2 9.2 gun emplacements
	- c1940 below ground remains – engine room and magazines
HENRY HEAD	- 1877 Henry Head Fort
	- WWII Searchlights and lookout posts
GREEN POINT	- 1871 -1885 battery
	- post 1892 battery
	- WWII anti-submarine features
GAP BLUFF	- c1912 gunnery training wall
GEORGES HEAD	- 1879 casemate
	- 1886 armoured casemate group
	- 1942 WWII searchlight, lookout posts and gun positions
MIDDLE HEAD	- 1871 onwards inner fortifications
	- 1853 onwards outer fortifications
NORTH HEAD	- 1941 Blue Fish radar station
	- WWII Headland lookouts and searchlights
OBELISK POINT	- 1801 battery
	- 1889 submarine miners observation post
	- 1892 Nordenfeldt gun site
	- WWII case battery features
SOUTH HEAD	- 1871 battery and engine house
	- WWI AND WWII cliff edge structures
	- sandstone drainage moat and rifle post wall
STEELE POINT	- 1871 and later fortifications

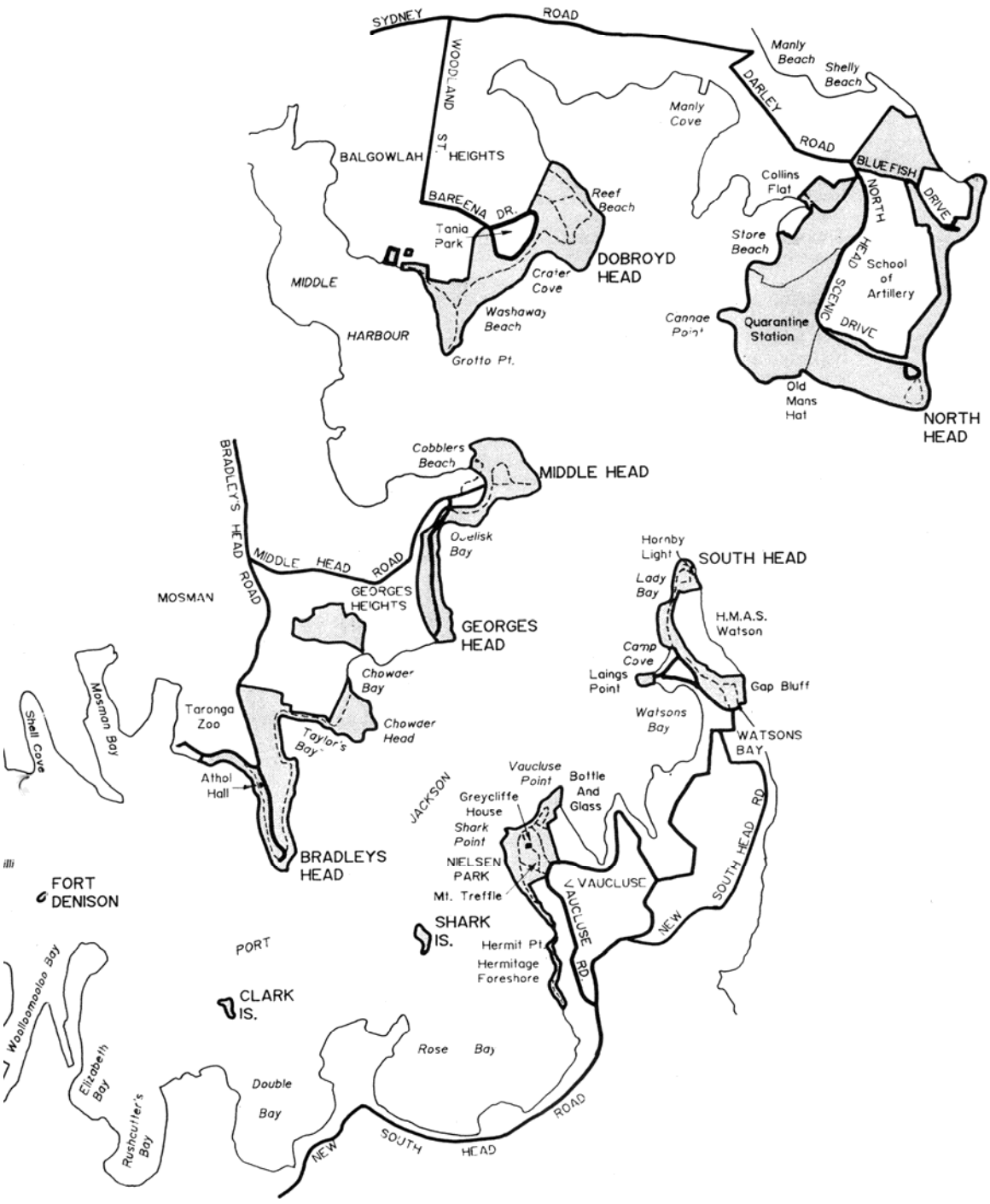


Figure i Overall plan of east end of Sydney Harbour showing extent of Sydney Harbour National Park and the location of the fortifications in NPWS management. NPWS Draft Plan of Management for Sydney Harbour National Park 1996.

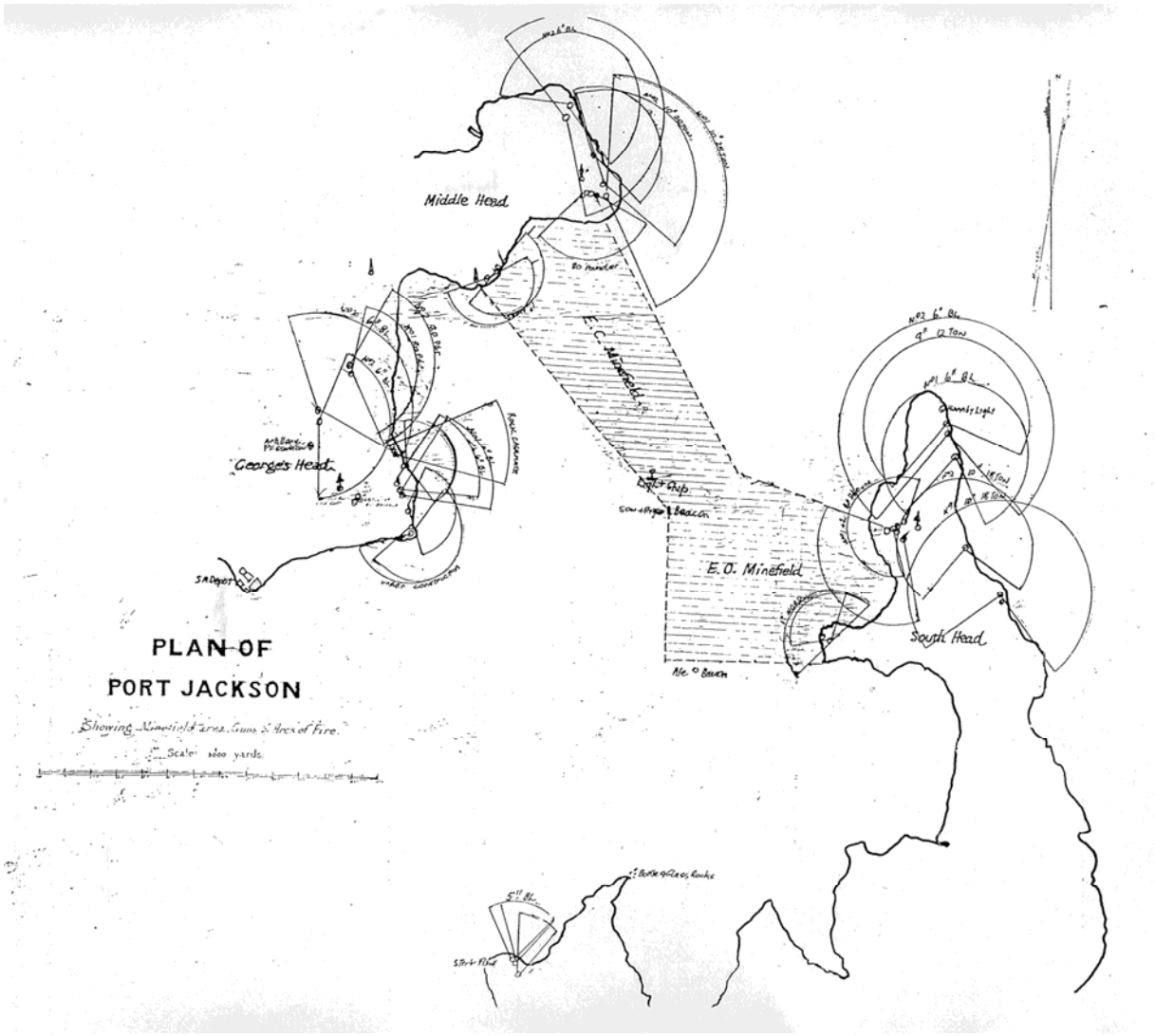


Figure ii Early map showing the major fortifications from the period up to 1900 incorporating Middle Head, Georges Head, Obelisk Bay, Bradley's Head, South Head, Gap Bluff, Steel Point and Green Point. NPWS records.

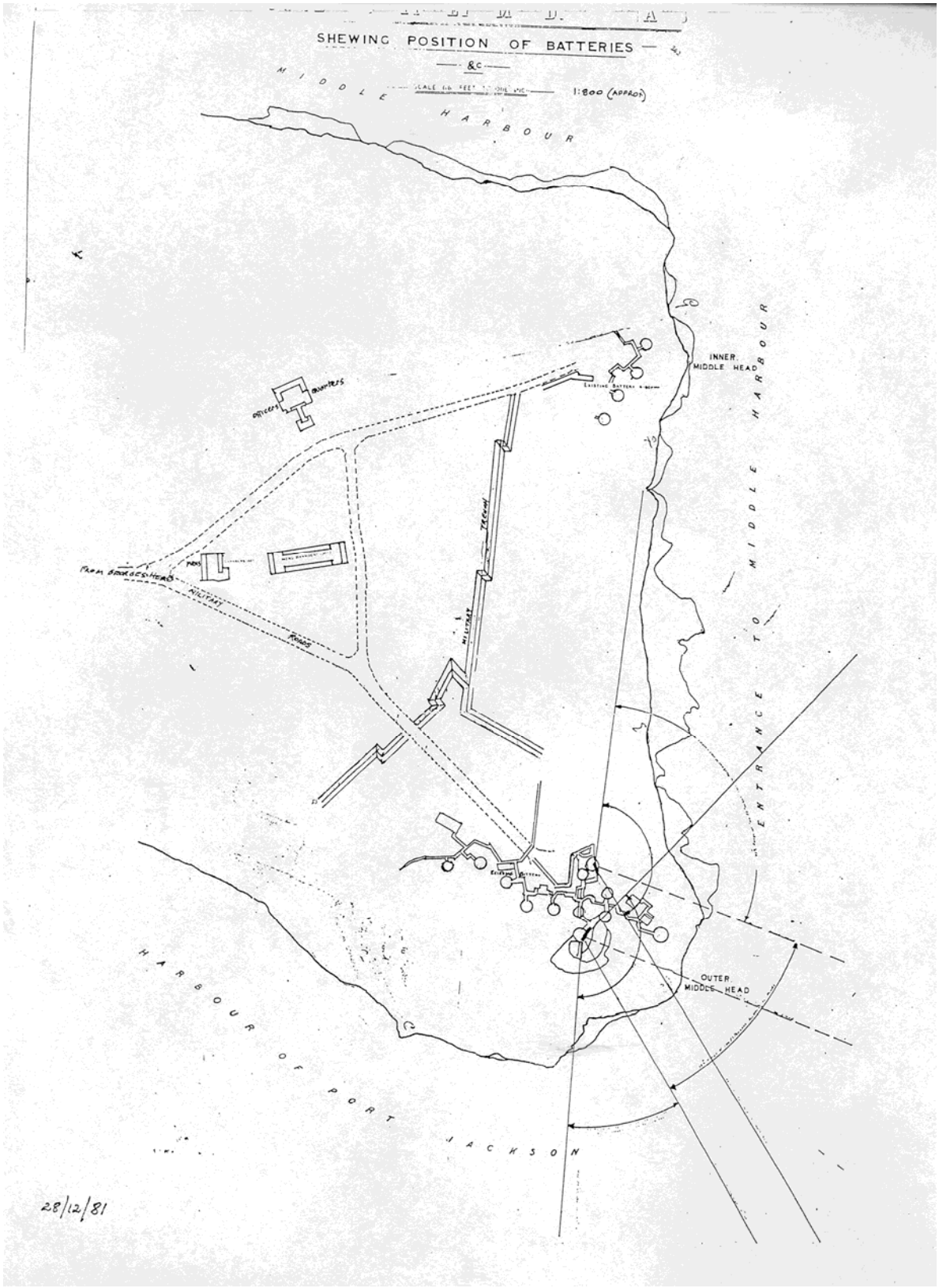


Figure iii Detailed plan of the major Middle Head fortifications dated 1881 as an example of early mapping that exists for some sites. NPWS records.

Discussion and Policy Development

Figure iii Interior of the recently discovered below ground engine room at South Head, a very significant and exciting discovery that will require extensive work if it is to be accessible in the future. This space highlights the difficulty in bringing together significance with management of a very broad range of sites with complex conservation, access, security, interpretation, cost and OH+S issues. Photo Paul Davies 2006

Significance

It is clear from the numerous studies that all of the fortifications are of high significance and all have significance at State level, particularly as a group. This is irrespective of their condition, intactness, phase of use or location. As a group, the fortifications of Sydney (including sites not owned by NPWS) are also of National significance in their role in the defence of the colony, then NSW and also Australia at its major harbour and naval facility. The facilities are also linked to other fortifications on the NSW Coast (and around Australia) and form part of a broader significance.

A summary statement of significance for the whole collection of sites is set out following:

> *The fortifications of Sydney Harbour and Botany Bay are of exceptional significance for their collective ability to demonstrate all aspects of the fortifying of first the remote colonial settlement of Sydney and later the port and main defence of the State and Commonwealth based in Sydney Harbour.*
>
> *The elements range in age from 1801 to the Vietnam War and exhibit complete and intact installations from each phase of the development of fortifications as well as extensive layering of sites over each other as the need for defences changed. Although most of the ordnance has now been removed from sites they retain the*

ability to graphically present how Sydney was fortified and provide opportunities for interpretation of the development and defence of Sydney from 1800 to the present day.

The fortifications collectively demonstrate the political climate of each major stage of works as the relationship between the colony and Great Britain was defined and New South Wales and later Australia increasingly became independent of British support following the withdrawal of Imperial troops and the need for the colonies to provide their own defences. The various developments also demonstrate the ineptitude of much of the British advice that was given with nearly all of the Victorian fortifications redundant by the time they were constructed. While the early structures are impressive in their scale and engineering they were largely ineffective as defences. In contrast the later twentieth century installations, while not being required to engage in active defence, were more suitable and pragmatic as responses to potential threats.

The early fortifications, in particular, also provide important insights into the perceived vulnerability of the early colony where threats were seen from Napoleon, Russia, the Americas and the French. While none of these eventuated , largely due to the distance of New South Wales from any potential enemy, it is unlikely that the fortifications would have provided effective protection if there had been an attack.

The fortifications, particularly as a group, provide the largest collection of fortifications in Australia and are nearly all related visually and functionally occupying the key headlands in the Harbour and Botany Bay. Their inter-relationship, which was functionally required to provide protection to the Harbour, has the potential to be interpreted.

Each site within the group provides important historical technical information about design, construction and operation of the fortifications and each site has archaeological potential with many features infilled and new features being uncovered over time.

The development of fortifications in Sydney is associated with many prominent people over a long period of time. Key political and military figures were associated with the developments along with military advisers and designers such as Scratchley and Jervois from England and important local designers such as Barnet.

All of the sites fall within the Sydney Harbour National Park and have important natural values in addition to their cultural heritage values. They all sites of outstanding scenic beauty and interest, most are prominent lookouts that provide panoramic views to the Harbour, a number of sites are within established parks with high levels of visitation.

However within the overall study group there are degrees of significance largely based on their rarity and relationship or comparative value in relation to other facilities. The ability of sites to be interpreted, to have public access and their condition also has some bearing on the assessment of significance in that sites that are accessible and well located or sites that are sound in condition, if similar to those that are remote and in poor condition have been assessed as potentially higher value. Strictly this is policy rather than significance as these areas are separated in the assessment process but given the overall high significance of the sites and the need to provide comparative analysis to allow for future management this has been factored into this discussion and policy section.

The following table attempts to identify major features that are rare and to rate on a comparative basis the most significant elements of the group. This rating is all within the context of all sites being considered to have State level heritage significance. The term regional has been used in the following table as it has been used in most of the earlier reports even though the term is no longer used in making assessments of heritage value. The column showing recommended levels of significance removes the regional category.

The sources of information used in this assessment are not always accurate or clear. Searches have been undertaken of the State Heritage Inventory (SHI) for example under the categories of owner and the theme of fortifications which revealed only five sites within the state under the ownership of DECC, these included Bare Island, Fort Denison, Middle Head and Goat Island. However it appears that other sites are listed as they appear in various plans and documents. The table is an assemblage of best information at this time. Generally conservation management plans provide the most accurate assessments of significance.

The grading used in the following table is based on all items being of State significance with the most significant sites being rated as State - 1, the main group of sites which are representative rated as State - 2, and the balance of sites which are perhaps less intact, in worse condition and not the essential sites to interpret rated as State - 3.

The sources consulted were Register of the National Estate, HHIMS, SHI, CMP's and individual various reports and assessments.

Table i Existing and Recommended Significance Assessments of sites

Location and Existing Assessed Significance	Illustration	Recommended level of Significance
BARE ISLAND RNE - National SHI - National, State, Regional, Local HHIMS - State CMP - National, State, Regional, Local		**State – 1** **National**
- access bridge		**State - 1**
- 1871 and onwards fortifications as a whole on the island		**State – 1** **National**
- 1889 barracks building	**State – 1** **National**	**State – 1** **National**

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
BRADLEY'S HEAD SHI - State SHI - Regional		**State – 1**
- 1853 harbour front fortifications		**State – 1** **National**
- 1871 fortifications		**State – 1** **National**
CAPE BANKS HHIMS - Local		**State - 3**
- c1940 above ground remains – 2 9.2 gun emplacements		**State - 3**
- c1940 below ground remains – engine room and magazines		**State - 3**
- c1940 observation posts and control rooms		**State - 3**

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
HENRY HEAD HHIMS - Local		**State - 1**
- 1871 battery with disappearing guns		**State - 1**
- WWII Searchlights and lookout posts		**State - 3**
GREEN POINT SHI - State SHI - Local		**State - 2**
- 1871 -1885 battery		**State - 2**
- post 1892 battery		**State - 2**

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
- WWII anti-submarine features		**State - 2**
GAP BLUFF		**State - 3**
- 1912 gunnery training wall		**State - 3**
GEORGES HEAD SHI - State CMP - National, State, Regional, Local		**State – 1** **National**
- 1871 beehive casemate group		**State – 1** **National**
- 1886 armoured casemate group		**State – 1** **National**
- 1942 WWII searchlight, lookout posts and gun positions		**State - 3**

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
INNER MIDDLE HEAD SHI - State, Regional – SHI CMP - National, State, Regional, Local		**State – 1** **National**
- 1871-1889 battery remains		**State – 1**
- 1889-1918 battery remains		**State – 1**
- 1940-1945 guns and observation posts		**State – 2**
- 1871 fortified trench		**State – 1**
- fortified moat		State - high

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
OUTER MIDDLE HEAD SHI - State, Regional CMP - National, State, Regional, Local		**State – 1** **National**
- 1871-1882 battery remains		**State - 1**
- 1882-1892 modifications		**State - 1**
- 1892-1911 emplacements		**State - 1**
- 1912-1945 battery		**State - 2**

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
- post 1945 elements		**State - 1**
NORTH HEAD		**State - 1**
- 1941 Blue Fish radar		**State - 1**
- Headland lookouts		**State- 3**
OBELISK POINT		**State – 1** **National**
- 1801 battery		National State - high

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
- 1889 submarine miners observation post		**State - 3**
- 1892 Nordenfeldt gun site		**State - 3**
- WWII Case battery features		**State - 3**
SOUTH HEAD SHI - Not assessed but data sheet prepared		**State - 1**
- 1871 battery and engine house		**State - 1**

Location and Existing Assessed Significance	Illustrations	Recommended level of Significance
- WWI AND WWII cliff edge structures		**State - 3**
- sandstone drainage moat and rifle post wall		**State - 1**
STEELE POINT AHD – not specific about level of significance however it can be assumed it is national		**State - 1**
- 1871 and later fortifications		**State - 1**

Notes

1 It is noted that the various data sheets and reports are not always clear about levels of significance, many do not contain statements of significance and it is clear that different frameworks for assessment have been used in making statements. It is also difficult to determine on some data sheets what the listing covers and whether an assessment applies to all items or just some elements of the site. Consequently this table should only be used as a guide to the current listings.

2 The recommended level of significance only considers National or State values, all sites are assessed as significant at local level.

The conclusions drawn from this assessment are that:

1 Groups of sites that demonstrate layers of development in a single location are particularly significant for their ability to demonstrate changes in approach to defence.

2 The broader Middle Head area contains the largest collection of rare sites and also contains an exceptional layered group of forts from the earliest structures through to the Vietnam War.

3 While individual installations are significant, greater significance is found in larger complexes that provide opportunities to understand the range and complexity of the fortification of Sydney.

4 While all sites are of such significance that they should be retained, not all sites are required to demonstrate the fortification of Sydney and different management strategies are appropriate for sites of varying levels of value. Some sites are recommended to have a strategy of no active management.

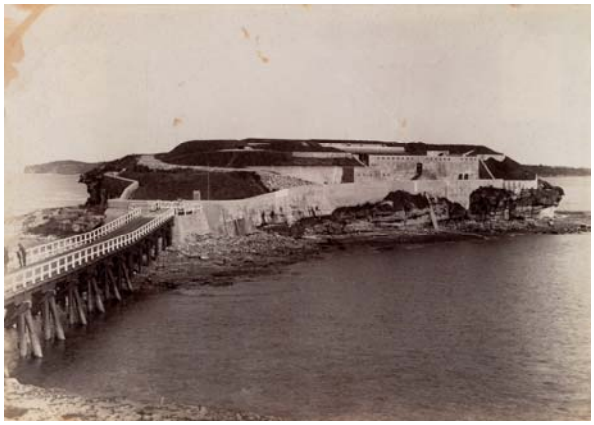
5 All sites or elements of highest significance require stabilisation, conservation and management to ensure that there are no further losses of significance.

Recommendations

1 HHIMS data sheets require review and revision with many containing inadequate information. The HHIMS data base should be systematically upgraded with current information from recent CMP's and other reliable sources to reflect the significance of each place within the context of all of the fortifications.

2 A consistent approach to significance should be adopted across all fortification sites (including those not owned by NPWS).

3 A current search of all data bases should be undertaken to obtain the latest listings this should include, State, National and local council as well as other recognised data bases.



Historic photographs showing early appearance of several fortifications. It is interesting to contrast the working form and appearance with largely cleared sites to the pre-fort form of the location and the current usually revegetated form of the sites.

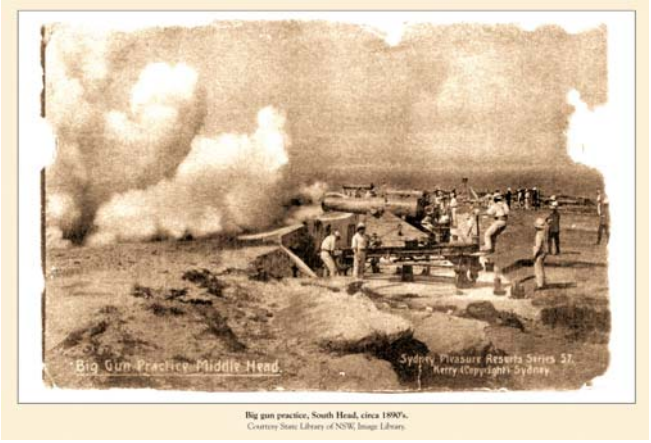
Top left: Bare Island prior to construction of the fortification.

Top right: Bare Island at the completion of all fortification works.

Left: Bare Island after the first stage of works.

Bottom left: Hornby Battery shortly after completion.

Below: The Gunnery training wall with guns at Gap Bluff.



Big gun practice, South Head, circa 1890's.
Courtesy State Library of NSW, Image Library.

Condition

The condition of the various sites varies dramatically depending on a very broad range of factors. There is no simple approach to maintaining or managing the sites as almost all are at some stage of ruination. This in itself raises questions as the ruinous state forms part of the high aesthetic and historic appeal of a number of the sites. The sense of discovery for visitors at some sites of an abandoned structure is part of the appeal of the experience. This attribute potentially affects the way structures are conserved and managed to ensure that their appeal, the ruination process and the visitor experience are balanced with conservation and maintenance.

Some sites have had extensive conservation work undertaken, often at considerable cost, others have minor work and many sites have no past or ongoing program of maintenance or conservation.

It is clear from site inspections that an overall maintenance strategy and program is required across the whole of the fortification sites. This should apply to every site whether it is part of an active maintenance program or not.

It is also clear that an overall conservation works program needs to be developed across all the sites so that the benefits of knowledge, techniques, research, trade skills, etc can be utilised broadly. This program would establish priorities for work, funding, identify similar problems across a number of sites, prevent re-investigation of areas already investigated, etc.

Linked to the above programs is the need for a regular monitoring program across the sites. At its most basic level this would be a routine inspection, probably annually, to review the overall sites against a number of criteria and to provide a report in a set format that can be used over time to track patterns of deterioration, effectiveness of work etc. Despite the often extensive work undertaken on some sites there appears to be difficulty in the routine maintenance and management of nearly all of the sites. This is due to a number of factors and does not reflect on staff commitment or interest but does relate to under-resourcing, changes in staff and the lack of a core skill base.

Given that there is not a high level of consistency over time in staffing to a project as complex as the fortifications in combination with its wide spread of site locations that extend over several management areas within NPWS with separate staff it is essential that a system of monitoring, maintenance and conservation be instigated that provides a consistent framework to work within.

The following discussion looks at maintenance, monitoring and conservation works as separate elements. For the purpose of this discussion the sites are grouped by location rather than by element as their management is more closely related to this structure. The areas discussed are:

Conservation Work

All of the sites would benefit from a conservation works program. The extent of a comprehensive program is beyond the capacity of NPWS or any other agency to fund and manage, consequently conservation works need to be carefully targeted to achieve value for money expended, to address urgent stabilisation works and then to undertake key projects that conserve the most significant structures and which provide for public access and interpretation. The table in this section identifies and ranks conservation works focussing on sites that satisfy these criteria.

Considerable conservation work has been undertaken in the past, most of which is well-documented. Significant projects include placing a membrane over the armoured casemate complex at Georges Head, stabilisation of the beehive casemate, supporting structures in accessible underground structures at Middle Head, membranes on buildings at Bare Island to mention the more obvious works. Other sites have had no conservation work carried out and the features remain as abandoned.

This study recommends that a detailed review of all conservation works undertaken and proposed be carried out with several objectives:

1 to establish a register of works so that future staff and consultants can easily understand what has happened to each structure
2 to allow those works to be monitored over time to assess their effectiveness
3 to ensure that work schedules or programs are not repeated or missed when considering future works
4 to provide proper property management
5 to allow schedules of work to be re-used on similar elements at other sites where records are split between various regional offices

To implement this a register of all reports, plans schedules drawings etc for each site should be established with a common repository of those reports (or copies) so that the extensive archive of material can be searched and accessed with ease. From this a management system needs to be developed where each structure has a property file where all information relevant to the maintenance and conservation of the item is kept. This record would include annual inspections and reports.

For key sites these records may be extensive, for other sites the record will be minimal simply recording regular inspections as there are sites where no further work is proposed but which still require monitoring and inspection.

Figure x Conservation work to timber elements in the underground magazine at South Head to reinstate deteriorated elements based on careful research and site investigation.

Table ii Existing Condition and Recommendations for conservation works

Location	Existing Condition	Recommendations	Priority
BARE ISLAND	The overall condition of the island varies from reasonably sound condition to areas requiring significant work. Extensive work has been undertaken over much time to rectify major building defects, but these were inherent in the place from the time of construction. There have been various assessments and work undertaken, however there remain many significant areas of work requiring attention and a considerable cost commitment over a long period of time. An area of recent concern is the subsidence of lawn areas on top of the fort. A reason for this has not been determined at this time. The site is capable of use and public access without further major works taking place.	This is one of the most significant fortification sites in NPWS management and should be a priority for ongoing conservation work. 1 Review existing conservation works programs and summarise 2 Identify gaps in the various schedules and prepare a co-ordinated overall conservation strategy for the site. 3 Determine a short, medium and long term conservation works program aligned with other strategies to allow enhanced public access and use 4 Monitor subsidence and take action if subsidence increases. 5 Prepare costings for NPWS works programs	HIGH HIGH HIGH HIGH HIGH
- access bridge	The bridge has been repaired and requires further works, these are scheduled to take place. The bridge should be in operational condition after these works.	5 Budget for ongoing maintenance and future long-term repairs and upgrade to the bridge.	LOW
- 1871 and onwards fortifications as a whole on the island	Key conservation issues are the poor quality of original concrete, conservation of finishes, metals and waterproofing.	6 Establish conservation priorities from the existing reports, link priorities to essential works to prevent ongoing deterioration and also to works that benefit interpretation and public access.	HIGH
- 1889 barracks building	Generally poor even though extensive work has been undertaken to the roof and verandah areas which has rectified many major problems with the building.	7 Determine future use for the building prior to undertaking further works.	MEDIUM
BRADLEY'S HEAD	Generally the Bradley's Head fortifications are in good condition and have had conservation works undertaken to ensure the preservation of much of the fabric. This arises partially from the high visitation of the area and the need to maintain the site in a safe and accessible condition. Most of the issues of conservation relate to long-term failure of materials, however on this site they are relatively minor failures and conservation work is minimal.	1 The work is largely maintenance work. 2 Prepare overall works schedules from existing documentation and more updated site review.	MEDIUM
- 1853 harbour front fortifications	These are solid stone elements on the cliff edge that are generally robust in character and require little conservation work. Where stonework is deteriorating some work is required in pointing and stone repairs.	3 Undertake detailed assessments of the stonework and prepare a schedule of works with costings. 4 Ensure that no further railings or fixings are made to the 1853 fabric and that existing fixings do not create failure of stonework.	HIGH MEDIUM

Location	Existing Condition	Recommendations	Priority
- 1871 fortifications	These are some of the best conserved elements in the harbour fortifications and contain ordnance as well as the base structures, in largely their intact form. Requirements for conservation relate to some stone deterioration, stabilising the rifle gallery rear wall, materials conservation to timber and built in steelwork generally and in particular to sub-terranean areas, removal of graffiti, pointing of areas of stonework	5 Prepare a schedule of conservation works against a time frame and cost estimates.	MEDIUM
- WWII lookout anti-aircraft emplacement	The structures are deteriorated largely due to concrete failure, plant invasion and abandonment.	6 Remove deteriorated concrete elements where there is risk of collapse or failure.	MEDIUM
CAPE BANKS	Cape Banks comprises two gun emplacements with their respective underground features, the remains of the engine room (not located), a first aid station, an underground plotting room and an adjacent control and observation post. All sites are completely abandoned, secured and public access is not encouraged but is available. There is no program of conservation or other works. The elements are quite dangerous both in the actual elements that remain but also with the prospect of contamination in underground areas. The conservation needs of the complex are very high, but given its remoteness, the undesirability of access and the overall state of the site there is little prospect of conservation work being undertaken.	1 Conservation work should be restricted to works that are essential to make the site safe and to minimise risks to the public. In most instances this will be related to removing damaged elements that present a hazard or securing the place. 2 Establish a detailed strategy in relation to concrete structures across the fortifications on which structures are to be conserved and relate the strategy to public risk and OHS issues.	HIGH HIGH
- c1940 above ground remains – 2 9.2 gun emplacements	One gun emplacement is accessible the other is infilled but eroded, Severe sand erosion around the sites has changed the setting and character. A number of above ground vents and access points that are now secured are in poor condition any may require stabilisation to prevent access. There is very severe concrete spalling to most structures, extreme metal corrosion and in time there is high probability of the collapse of a number of structures.	3 Remove dangerous elements of the site such as severely eroded metal doors. 4 Secure potential access areas, if necessary by removing the structure above ground and infilling (refer to recommendations under security).	HIGH HIGH
- c1940 below ground remains – engine room and magazines	The below ground elements are in generally sound but abandoned condition. There is remnant fitout from the second world war phase. These areas, at this stage, require no conservation works apart form security.	5 Prevent access to the below ground areas, access only on restricted and controlled basis.	HIGH
- c1940 observation posts and control rooms	The below ground structures are sound and require no conservation works. The above ground elements are deteriorated and suffering from concrete deterioration . Over time they will either need to be stabilised or removed.	6 Secure potential access areas, if necessary by removing the structure above ground and infilling (refer to recommendations under security).	HIGH

Location	Existing Condition	Recommendations	Priority
HENRY HEAD	Henry Head comprises two principal sets of installations, the 1871 battery and the second world war elements, they have substantially different conservation needs. The earlier battery has two disappearing gun positions, underground facilities and substantial external areas cut out of the rock to provide access. Most of the underground elements are secured however the main gun position (now roofed in concrete) and some of the smaller ground level rooms are open. The location is on a walking track but not accessible by public road. The WWII elements are all accessible and in very poor condition, however several are difficult to access due to undergrowth. The site is not maintained nor is there a conservation program. It is however managed on a regular basis with security checks. Other elements such as the entry road survive with evidence of original construction. There is considerable vegetation regrowth.	The site should be retained generally in its current form but with conservation works to the items set out in the detailed sections below.	MEDIUM
- 1871 battery with disappearing guns	This is a very fine installation that overall is in fair condition but requires conservation works to a number elements. The site should not require extensive future works to maintain its current condition but the elements such as metalwork, some timberwork and areas of deteriorated stone will be lost if conservation work is not undertaken.	1 Prepare a conservation works program for at risk items in the 1871 battery as a one off exercise. 2 As required replace stone sills to prevent further loss of material. 3 Retain road formation and surface by removing vegetation. 4 Conserve concrete elements and repair with grouting etc as required over time	MEDIUM MEDIUM LOW LOW
- WWII Searchlights, gun position and lookout posts	These elements which are located on the cliff top and on the rise behind are all severely deteriorated and will in time collapse. They have very severe metal corrosion to both columns and reinforcing causing major structural failure. Their collapse is not imminent but at some point in the foreseeable future it will be necessary to partially demolish the structures to avoid risk.	3 Do not undertake conservation works but assess on a routine basis to determine when action is required to remove at risk elements, this may include sections of the buildings. Propping of some sections may be possible to extend the life of site elements. 4 Remove any high-risk failed materials such as concrete reinforcing or spalling concrete.	HIGH HIGH
GREEN POINT	The site comprises a range of features with various conservation needs. The major part of the site is below ground and is not generally accessible, conservation work is not proposed to this area given its low access potential and reasonably sound condition.	1 After site clearing, assess and schedule conservation works required to stabilise the site in its present form and general condition. 2 Prepare budgets for immediate and longer term works.	MEDIUM MEDIUM

Location	Existing Condition	Recommendations	Priority
- 1871 -1885 battery	The extant elements require repair following clearing of vegetation. Concrete repairs to the lower entry portal and potentially concrete repairs to the roof of the observation area should be scheduled. It is not recommended that access be provided, however, if is to be provided at any time, the interior the tunnels should be cleared of debris to provide safe access.	3 Establish priority works for repair to the concrete work and the provision of improved tunnel access.	MEDIUM
- post 1892 battery	See above	See above	See above
- WWII anti-submarine features	The brick structure on the waterfront is sound apart from vandalism to one corner to achieve access.	4 Reinstate and repair damaged brickwork as a priority.	HIGH
GAP BLUFF	The surviving elements are the wall and associated concrete pavements and gun positions and the metal support for a flagstaff. The wall is in fair condition but has some concrete deterioration, metalwork is sound but the flagstaff base requires conservation.	1 After site clearing assess the wall for damage, grout cracks and stabilise previously damaged areas. 2 Clean back and treat the flagstaff base.	MEDIUM MEDIUM
- 1912 gunnery training wall	See above	See above	See above
GEORGES HEAD	The casemate structures have had extensive conservation work and assessment, perhaps more than other fortification sites around Sydney. Not all reports identify the same work and there appears to be little long-term consideration of the impact of works. Further conservation work is required to each structure on the site to provide for ongoing access and to prevent loss of fabric.	See below	HIGH
- 1871 beehive casemate group	Generally sound condition given the age and location of the structure. Ongoing issues are water ingress for which several solutions have been proposed and repair of interior finishes where they are failing. Extensive research has been prepared on this structure.	1 Monitor water ingress and action over the next year. 2 Review proposals with a view to minimising site intervention. 3 Undertake urgent minor conservation works to make the place safe for access.	HIGH HIGH HIGH
- 1886 armoured casemate group	Extensive work has been undertaken in waterproofing and securing the building. This includes the membrane roof, some render work and propping of failing areas of plasterwork. Further minor works are needed to repair the external membrane where it has cracked, this may be an ongoing issue. Fragile plasterwork needs to be secured to prevent further loss. Physical barriers should be minimised and methods developed to secure loose plaster. Failed timberwork supporting slabs should be replaced to allow access. Metalwork and other internal finishes require long-term monitoring.	1 Repair membrane as a priority. 2 Repair internal timberwork as a priority. 3 Investigate plaster repairs and establish works program 4 Develop longer-term programs for other internal finishes. 5 Clear out water reservoir 6 Develop a program for metal conservation 7 Stabilise adjacent external structures	HIGH HIGH MEDIUM MEDIUM MEDIUM MEDIUM MEDIUM

Location	Existing Condition	Recommendations	Priority
- 1942 WWII searchlight, lookout posts and gun positions	These are in slowly deteriorating condition and are generally not accessed by the public. The structures are concrete and are slowly failing with exposure and tree growth however they are in relatively good condition. General works required should be limited to grouting obvious cracks to prevent water ingress and ensuring that there is no dramatic change in condition.	1 Undertake minor conservation works program.	MEDIUM
INNER MIDDLE HEAD	Inner Middle Head comprises a range of sites that are overlaid and set within regrowth, the earlier sites are covered over and have not been investigated, it is not known what remains of these elements. The remaining underground areas are in fair condition although parts have been infilled and require conservation work. A number of sites remain in very deteriorated condition and are not recoverable.	1 Prepare a detailed conservation works program for the main elements of the site.	HIGH
- 1871-1889 battery remains	The found and accessible parts of this complex are underground and are in fair condition. Stonework is slowly deteriorating from water ingress but sections of timberwork and steelwork remain largely intact. Areas formerly infilled have eroded with build up of soil around entry points.	2 Secure the northern tunnel end with a steel gate and remove build up of soil. 3 Excavate the main external entry point to recover the former base and walls. 4 Conserve remaining timber and metalwork.	HIGH MEDIUM MEDIUM
- 1889-1918 battery remains	This comprises two gun positions, one now infilled with access trenches and tunnels. The main gun position is in good condition requiring minor conservation work to prevent concrete deterioration, the infilled emplacement has eroded allowing access to the tunnels and providing risk. A further element of this group is the underground tunnel and range finding station, it is located remote from the gun emplacement. It is in largely intact and accessible. It is in overall good condition with recent damage from invasive plantings and build up of ground levels and debris.	5 Undertake minor conservation works to concrete elements 6 Secure infilled emplacement. 7 Conserve timberwork to range finding station 8 Clear drainage lines in range finding station.	HIGH HIGH MEDIUM MEDIUM
- 1940-1945 guns and observation posts	There is a mixed group of structures that can be found in the bushland adjacent to an access track linking to the outer fortifications. The main structures are concrete observation posts that are now unroofed.	9 Remove debris and check concrete for deterioration.	LOW
- 1871 fortified trench	This is in mixed condition. Sections have been infilled and should preferably be excavated. The stone wall that extends to the cliff edge has collapsed at its outer end and requires stabilising. The balance of the wall is in fair condition.	10 Repair falling end to stone wall near cliff line. 11 Excavate trench.	HIGH LOW
- fortified moat	This is largely infilled but recognisable, it contains various regrowth plantings.	No action required.	-

Location	Existing Condition	Recommendations	Priority
OUTER MIDDLE HEAD	Outer Middle Head is the most complex site examined with its high level of visitation, layers of development and range of facilities. There are many conservation needs across this site covering most areas and materials. The key matter is to prepare a staged conservation works program to ascertain need, priority and costing. This needs to be balanced with the ruined character of the site which will over time see some elements deteriorate.	1 Prepare a staged conservation works program to ascertain need, priority and costing.	HIGH
- 1871-1882 battery remains - 1882-1892 modifications - 1892-1911 emplacements - 1912-1945 battery - post 1945 elements	This report addresses key areas only in terms of conservation work and does not attempt to separate the closely interlinked site elements. Stonework There is extensive deterioration of both cut bedrock and laid stone elements, however most of the deterioration is difficult to rectify as it relates to water and wind action, both of which in most situations cannot be rectified. More isolated deterioration due to steel rusting etc can, if critical be repaired. The major issue is removing water from the site to slow deterioration. Monitoring is essential. Concrete There is considerable deterioration of concrete work around the site through spalling with rusted steel elements, cracking of poured concrete elements, delaminating of concrete pours. The more obvious examples are ceilings where rusted steel beams have resulted in a loss of bottom cover and the plastered finish, this will be ongoing. The second world war concrete elements feature rusting reinforcing (not found in earlier concrete) which will either require extensive repair or some loss. Cracking in structures requires concrete grouting to prevent water entry and increasing deterioration. Steelwork The steelwork is largely the roof support structures with mass concrete poured over them, long-term water ingress has resulted in rust. While in most cases deterioration is slow it will inevitably result in structural failure of some areas. Support structures may be required over time to prevent failure, this has already been installed in some locations. Timberwork Remnant timber elements survive, but most have been removed. Those that remain require ongoing conservation work.	2 Undertake conservation works to drainage systems to remove water from the structures 3 Replace severely damaged stones if failure is imminent. 4 Remove deteriorated stone debris from floors to prevent blockages to drains. 5 Repoint joints as they fail. 6 Investigate steel treatments to deteriorated steel elements to reduce the rate of deterioration of exposed elements particularly in roof support beams. 7 Monitor concrete deterioration. 8 Undertake a grouting program to fill minor cracks and stabilise at risk concrete work. 9 Prepare a program of repair and reinstatement of damaged concrete elements seen in cracking of concrete around rusted steel, structural cracking of concrete, surface cracking of finishes. 10 Investigate steel treatments for exposed at risk steelwork to reduce the rate of deterioration. 11 Itemise timberwork requiring conservation and prepare works program.	HIGH LOW HIGH MEDIUM HIGH MEDIUM HIGH HIGH HIGH MEDIUM

Location	Existing Condition	Recommendations	Priority
NORTH HEAD	The North Head sites are spread and are largely in bushland. The Blue Fish sites have been recently cleared and connected to walking tracks however conservation works have not been undertaken or programmed. The sites managed by NPWS are second world war sites of concrete construction, they are overall in poor condition.	Conservation works are not proposed to these features although maintenance is required. 1 A conservation program should not be undertaken to these sites. 2 The sites generally should be allowed to continue to ruination with only works undertaken to avoid risks.	 NOTE NOTE
- 1941 Blue Fish radar	Blue Fish comprises five related sites three of which are now accessible. Other remnant features remain in the bushland but are difficult to find or understand. The last two sites are in ruined and very damaged condition and should not be identified or accessed. With the recent advent of public access there is pressure to undertake conservation work to make the sites safe. Generally this is not supported on this site and as the individual elements reach a risk assessment that is not longer accessible they should be removed from public access. Most deterioration is to concrete elements due to pouring of mass concrete, collapse, tree growth etc. Some immediate minor works could be undertaken to prevent severe deterioration.	3 Grout major cracking in concrete walls to prevent water entry. 4 Prop recesses (munition stores) to avoid risk of inevitable failure and collapse. 5 Gate basement room to prevent access as it floods and presents an unacceptable risk to the public.	MEDIUM AS NEEDED
- Headland lookouts and search light locations.	There are two structures, one concrete and one stone that are accessible, the other elements are on the cliff face and cannot be accessed. The concrete lookout has high public access and is in sound condition. It does not require conservation work.	5 Manage lookouts without further works. 6 Allow remote sites to deteriorate without intervention.	NOTE NOTE
OBELISK POINT	Obelisk Point is a collection of sites from a wide range of periods including the earliest fort in the area. There is no formal access and no work appears to have been undertaken at any time to the various elements. Some conservation work is required to secure the sites.	Conservation works will arise if public access increases to the area. Generally works should be minimal.	NOTE
- 1801 battery	The 1801 battery appears not to require conservation work due to its robust nature. It does however require clearing which is addressed elsewhere. Adjacent structures which were not identified in fieldwork may require some conservation work to stabilise them.	1 Undertake clearing works to prevent any adverse impacts to cut stonework elements.	MEDIUM
- 1889 submarine miners observation post	This is a small installation in poor condition. It is recommended that it not be conserved or accessed but allowed to slowly deteriorate.	2 Undertake no conservation works to this element	NOTE

Location	Existing Condition	Recommendations	Priority
- 1892 Nordenfeldt gun site	This is a small installation in poorish condition. It is recommended that it not be conserved or accessed but allowed to slowly deteriorate.	3 Undertake no conservation works to this element	NOTE
- WWII Case battery features	This is an extensive set of concrete WWII elements that are in poor condition with spalling concrete, rusted steelwork, extensive overgrowth, etc. There is an underground section that is secured comprising several rooms that appear to be in fair condition. The site has visitation and concrete work is at risk of collapse requiring some form of rectification work.	4 Remove failing concrete elements where cracking. 5 Remove failed steel pipe railings where they present a hazard. 6 Repair damaged brickwork to prevent access to structures. 7 Remove deteriorated metal and other materials from the publicly accessible areas.	HIGH HIGH MEDIUM HIGH
SOUTH HEAD	South Head is a key site with high visitation and the fortifications have had a good level of conservation work undertaken. Overall the place is in sound condition but always will require ongoing programs of work due to the nature of the structures and their high conservation needs. Recent work such as the repair of the concrete lookout location next to Hornby Light and the internal work to the 1871 battery is of high quality. Conservation works are required to a range of elements but not to others, the delineation is that cliff edge structures are not recommended for conservation works due to their inaccessibility and poor condition, but other areas are of high value and require an ongoing program of works.		
- 1871 battery and engine house	This complex is in several parts, the below ground battery, gun positions and the recently discovered engine room with very restricted access. Considerable conservation work has been undertaken to the accessible below ground areas including some reinstatement of missing timber elements. The site is well managed and conserved but there are ongoing conservation issues related to deterioration of stonework, steel elements, timberwork and the unknown nature of fill over some areas. Generally the installation is sound and does not require immediate works to stabilise. Over time conservation work or propping may be required to some areas. The engine room area requires further assessment as it is not adequately assessed in terms of conservation need, this will relate to safe access which is addressed elsewhere. This area presents opportunities for interpretation that do not exist elsewhere due to its untouched condition, this should be reflected in future conservation works programs.	1 Develop a conservation works program for these features of the site to initially complete any stabilisation works that are required for the next 5 years and then to address longer term issues such as: - stone deterioration - steel deterioration particularly Barlow rails in ceilings - conservation of old and replacement timberwork 2 Review the contents currently stored in the below ground area to ascertain whether they should be retained, how significant they are and if they need further work to conserve the significant elements. 3 Further investigate the engine room area to determine conservation needs (based on providing improved access). 4 Prepare and undertake a small scale program for above ground	MEDIUM LOW MEDIUM HIGH

Location	Existing Condition	Recommendations	Priority
	Apart from this, the overall approach to below ground areas will apply with monitoring and a longer-term works program to address issues that arise. Occasional public access in the form of tours requires a basic level of conservation and management of accessible areas.	elements including: - replacing failed steel tube handrails - minor concrete repairs including grouting cracks, removing growth, etc. - stabilising exposed steel reinforcing to prevent increased deterioration.	
- WWI AND WWII cliff edge structures	These structures are in two groups, several located above the cliff edge which are easily accessible and those on or below the escarpment which are accessible with difficulty. The structure adjacent to Hornby light has been conserved to a high standard, other structures vary with several on the point of collapse. No conservation work should be undertaken to structures below the top of the cliff line, they should be allowed to deteriorate and when required be partially or fully demolished based on their condition. The observation structure, located close to the waters edge is close to requiring demolition and should be carefully monitored. The cliff edge structures range around the harbour edge, many off main tracks but still accessible.	5 Continue to conserve cliff top structures where there is a high level of public access from paths and tracks. Develop a conservation program for these structures. 6 Do not undertake conservation works to structures below the top of the cliff edge.	LOW NOTE
- sandstone drainage moat and rifle post wall	This is a highly accessible and well visited site of great interest and integrity that remains in sound condition. It contains rock cuts, stonework, a stone flagged roadway and ordnance. Considerable work has been undertaken in conserving the area and ongoing work will be required to maintain the ordnance and in particular stonework.	7 Set out a program of conservation works for the ordnance 8 Program long-term conservation works to stonework	MEDIUM LOW
STEELE POINT	The battery is only partially located on NPWS land. The gun positions survive, one is open and one is infilled. Generally the stonework is in good condition. Access to the tunnels is bricked up near the site boundary. The area now forms part of generally accessible parkland. The lower access portal is also partially infilled with brickwork with an inner security door.	1 During annual maintenance inspection identify any conservation works required. 2 Program removal of partial infill brickwork to tunnel access as non urgent works.	MEDIUM MEDIUM (optional)
- 1871 and later fortifications	The battery is sound and does not require conservation work at this time with the exception of removing the brickwork partial infills to the entry area.	3 Allow for stone pointing over time 4 Unblock drains	MEDIUM HIGH

Summary

There is a high level of common ground in conservation works across many of the sites. Sites built at different stages have varying conservation needs, but they are often common to all of those sites. This largely relates to the use of materials at different construction phases.

The earlier sites, cut from rock with substantial stone elements, require relatively little conservation work due to their robust nature.

The mid nineteenth century sites that combine stone cut, stone walling, mass concrete roofs and walling often supported on steel Barlow rails have survived relatively well to date but in a number of areas are showing evidence of severe deterioration of steelwork and it appears quickly accelerating deterioration of the surrounding concrete and rendered elements. The key conservation issue in these areas (mostly subterranean) will be the condition of the steelwork and its capacity to support the applied loads of concrete poured over the steelwork as well as the earth fill over that. This is linked to the unknown quality of the concrete work. It should be assumed that there is no structural capacity from the mass concrete and that the steel rails simply supported are the structural system. Their potential failure needs to be monitored and managed carefully.

Recommendation:

- *It is recommended that a detailed study of several types of deterioration be undertaken, if necessary to actually test the capacity of the structures to provide a better understanding of likely risks and future conservation needs. Options that exist for rectification include:*
  - *propping - whether temporary or permanent*
  - *treating steelwork to slow deterioration – this needs to be investigated and should be subject to a detailed study and checking existing documentation to see what has already been determined*
  - *inserting a new substructure (framing) as a permanent support system*
  - *limiting access and loading of any areas above below ground structures.*
  - *ensuring that drainage is working in the vicinity.*

Stonework from this period suffers the usual decline of stone structures in exposed locations with wind and salt action causing fretting of stone surfaces and joints. Generally the stonework is of high quality and has survived extremely well, however some areas require repair and conservation to prevent ongoing problems. This is relatively minor at this stage.

The latter structures from the twentieth century with the use of reinforced concrete are the most tenuous and difficult to conserve. The quality of concrete work is clearly not always high and with abandonment and the very exposed location of most of these structures with close proximity to sea action and spray they have all suffered and in time all of these elements will be lost.

Recommendation:

- *A clear strategy as to which sites should be retained and conserved is proposed to concentrate on sites of value and which can be conserved and it is recommended that other sites be left to deteriorate and their ruinous state be managed.*

A good example of repair is seen at South Head where a poor condition structure has been conserved. This is a good and appropriate example of required action and should form a model for other similar structures identified for retention.

Figure xi An example of severe concrete deterioration at South Head which will in time if not treated cause structural failure of the element.

Figure xii Another example from South Head where extensive reconstruction of concrete has taken place and failed steel posts have been replaced with more robust concrete blocks to conserve this prominent concrete element.

The other areas of greatest impact on conservation work are addressed in the following section under maintenance, however the impact of vandalism and graffiti is considered under conservation.

Overall there is surprisingly little graffiti or severe vandalism. There are substantial breaches of security (addressed later) but no observed wanton damage of sites. It appears most intruders are interested in achieving access but do not actually damage the fabric. There is a fair level of graffiti to sites, particularly remote sites, but even this is not high and most of the significant finishes have avoided damage. There is though a high potential for vandalism and damage and as sites become accessible or more known, this will increase.

Almost no sites have total security, almost all can be accessed at any time by foot, even though remote.

The important aspect of vandalism is rectification. Removal of painted graffiti is important and should take place quickly, this will only happen if monitoring is regular and events reported and action is immediately available.

Recommendation:

- *It is recommended that as most of the vandalism will be applied paint to stone or concrete that removal systems be investigated and pre-planned with an annual contract available on call to remove graffiti.*

Figure xii An example of severe steel corrosion to Barlow Rail roof supports at South Head.

Maintenance

For this study the distinction between maintenance and conservation is the work carried out routinely by NPWS staff as part of their general workload in contrast to specific works that require some form of external input whether undertaken by NPWS staff or contractors.

The major maintenance items that are common to most sites are:

- ensuring that drainage systems where operable are working and kept in a cleared state
- removing debris (both natural and introduced) from sites to ensure that sites are safe where they are accessible
- maintaining security systems (covered separately later in the report) both to access points such as doors but also to shafts, vents and the wide range of small access points across most sites
- undertaking a systematic clean-up of sites, both accessible and generally non-accessible sites
- undertaking a systematic removal of unwanted plant growth both above and below ground (for underground installations) to prevent damage to fabric
- for managed sites undertaking a systematic removal of undergrowth from areas deemed to be at risk from plant interference to significant elements
- identifying and undertaking urgent works arising from routine inspections that will cover a wide range of areas.

The frequency of maintenance needs varies from site to site. Most sites need regular inspection even if no other works are undertaken and routine maintenance works can be scheduled as part of that inspection. Major sites with high public access should be maintained weekly, remote or abandoned sites may only need to be maintained annually. A full maintenance inspection should take place annually for all sites and an annual report prepared.

The two obvious problems that are common across all the sites are drainage and plant invasion. They are also the two maintenance areas that are likely to have the greatest impact on the long-term condition of most sites.

DRAINAGE WORKS

Maintenance of drainage systems is a routine and consistent issue that needs to be factored into work schedules. Drains need to be checked and cleared at least monthly (This will vary from site to site and needs to be determined over the first year of work to establish more accurate patterns. Work may be needed seasonally, weekly, monthly or in some cases annually. In all situations there needs to be an awareness of rectifying problems as they arise.) . Where drainage systems are inactive conservation work may be required and this would need to be separately factored in but most sites appear to simply need cleaning, possibly rodding of lines and occasionally barriers such as filtration systems to be used where there are heavy flows of sediment. A key aspect of managing water and drainage is monitoring (addressed in the next section) particularly during and after heavy rain to observe what is happening, where problems exist, where water comes from and whether it is creating specific problems. As most of the site affected are cut from rock or use heavy masonry construction there is relatively little damage to core structural elements but finishes are often fragile and important and failed water systems introduce new water issues into the structures.

Recommendations:

- *That all sites have a regular and routine program of drainage management as part of the maintenance program.*
- *That records be maintained to assist in determining frequency of work.*
- *For sites that have drainage failure a conservation works program be instigated to provide good drainage.*

Figure xiii Example of damage from self-sown and unwanted plant growth around edges of structures. Inner Middle Head fortifications.

REMOVAL OF PLANT GROWTH

The other most invasive aspect of all sites is unwanted plant growth in and around the structures. This varies from site to site and structure to structure but falls into the following groups of damage:

- General weed growth from cracks and crevices, in some cases small plants, grasses and trees growing in and on structures. This results in cracking of finishes or applied renders as plants or trees mature, roots accessing well into some structures (visible in some tunnel areas). Generally growth should be removed from structures and the root systems poisoned with an appropriate product to prevent regrowth. Joints may need to be pointed after removal.
- Trees or large plants growing immediately adjacent to site features causing structural failure of the element through root or trunk enlargement. This is evident in a number of locations where separation of elements through cracking and lifting of stones or concrete elements can be seen. In some locations lateral movement of walls can be seen which will result in time in failure of the element. All of this results in failure of elements and allows excessive water into the structure causing other problems for the fabric.

- Growth on infilled or built up areas of soil within or around structures that holds water in the structures and allows mould and deterioration to take place.
- General growth over below ground sites of trees and larger plants that has the potential to allow root penetration and damage to concrete roof slabs or stone elements.
- Falling limbs or trees onto the roofs or top of elements causing structural damage.

In some areas removing growth is straightforward as it only relates to the structure itself, in other areas where sites are located within bushland management of the area may be more complex. The following recommendations are made to manage invasive plant growth.

Recommendations:

- *Remove all weed and related growth from core sites* and elements and maintain with a routine program of maintenance. Define extent of removal for each area and map within the property file. Remove weed growth from other sites as specifically recommended for each site.*
- *Develop a system of approved herbicide applications to prevent regrowth to minimise future maintenance.*
- *Remove all trees and shrubs that are causing deterioration to any core site structure. Remove carefully, assess after removal for rectification works necessary to stabilise the feature or element. If removal of a tree will cause further deterioration seek advice prior to removal.*
- *Over time remove dead trees, over-hanging limbs etc where risk is identified to protect structures*
- *Remove plant growth and build up of soil and debris from vents and access points on a regular basis.*
- *Assess all below ground areas at core sites and selectively remove potentially invasive plantings and stabilise the area.*
- *Do not clear the landscape around sites to a point where their ruined state is compromised.*

  Notes

  * *Core sites are Middle Head (inner and outer), Georges Head except the WWII sites, Bradleys Head, South Head sites above the cliff top, Steele Point, Henry Head and Bare Island*

Monitoring

Monitoring is an important activity that is difficult to undertake as it requires a time and reporting commitment that is difficult to see results from in the short and even medium term. It was clear from site inspections that there is a need to regularly monitor a range of aspects of the sites including maintenance needs.

A short term benefit will be refining the time frames needed on each site for maintenance works. Each site will vary in extent of work and time frame for maintenance works that can only be determined by monitoring. It is recommended that after initial works are undertaken to catch-up on outstanding maintenance that monitoring over the ensuing 6 month period should be sufficient to establish an initial pattern of works. If work is required more often than 6 monthly it will be obvious and can be carried out with further monitoring, if it is not required within 6 months it is likely that annual work will be adequate.

For monitoring to be successful it needs to be easily reported with simple checklists that are filled out at each inspection. There needs to be provision to identify regular and one-off issues and for any one-off items to be placed on an action list with a priority attached.

Some sites will have specific monitoring needs that relate to safety, security and conservation work. All of these should be linked into one reporting system.

A particular monitoring need is the impact of wet weather on sites, particularly underground sites. All sub-surface sites should have at least one monitoring program during rain and in the week after heavy rain to determine patterns of water ingress and egress. Even on sensitive sites such as the beehive casemate where water is a significant issue this monitoring appears not to have been undertaken, of if it has, it is not reported.

The table in the following section sets out the recommended frequency of monitoring of sites based on available information and inspection, it also identifies the types of monitoring required.

An outline of a monitoring form could contain the following information:

- site name and location
- is the site secure, has there been attempted or actual break-in
- has their been vandalism
- are there any new OH+S issues evident
- does the building/feature/space require cleaning
- are drainage lines clear and operating
- is there evidence of flooding or water damage
- are there any changes in condition from the previous inspection, if so is remedial or conservation work required and in what time frame
- are there any structural failures or possible failures that require assessment
- are landscape works such as clearing, pruning, tree removal required, if so what works

Figure xiv Cape Banks structure interior that is easily accessible and full of rubbish from the site, note the graffiti that features as this site.

Figure xv A severe example of vandalism to gain entry to the below ground areas at Cape Banks. This not only requires repair but presents a serious risk to other visitors as there is a substantial drop with the gate removed. This type of activity needs to be monitored regularly and responded to quickly.

Table iii Existing Condition, Monitoring and Recommendations

Location	Maintenance Needs	Monitoring
BARE ISLAND	Maintenance issues are: - conserve the deteriorating building fabric generally around the site - maintain painted surfaces - conserve ferrous elements - maintain access bridge	Monitor the site at the following times and frequency: - weekly for general site security removal of rubbish and clearing of drains - annually for maintenance review - initially to determine extent of conservation works
BRADLEY'S HEAD	Maintenance issues are: - removal of invasive plant growth generally around elements - clearing debris and rubbish from features particularly underground areas - establishing an ongoing painting program for timber elements - clearing drains on a routine basis - regular removal of graffiti	Monitor the site at the following times and frequency: - weekly for general site security removal of rubbish and clearing of drains - annually for maintenance review - monthly for vegetation management - initially to determine extent of conservation works
CAPE BANKS	Maintenance issues are: - clearing debris and rubbish from the interior of accessible areas - maintaining site security to all areas (see security section) and ensuring that locks are working and in place - maintaining security screens and grilles - providing safe access to inspection gates - removing sections of concrete at risk of falling	Monitor the site at the following times and frequency: - monthly or as required by NPWS for general site security - annually for general inspection and report review

Location	Maintenance Needs	Monitoring
HENRY HEAD	Maintenance issues are: - clearing debris and rubbish from the interior of accessible areas - maintaining site security to all areas (see security section) and ensuring that locks are working and in place - maintaining security screens and grilles - removing damaged fabric such as doors and placing them in secure storage - remove build up of soil and sand within the below ground areas - clear the immediate surrounds to the 1871 fort of vegetation, particularly in the cut stone access way to the battery and in areas of stone cutting and working including the gun emplacement - removing sections of concrete at risk of falling - drill a drain hole in the base of the water tank to remove stagnant water	Monitor the site at the following times and frequency: - weekly or as required by NPWS for general site security - annually for maintenance review - annually for vegetation management - initially to determine conservation works
GREEN POINT	Maintenance issues are: - maintaining site security to all areas (see security section) - clear the immediate surrounds to the below ground areas that are presently overgrown and recover concrete and stone elements in the landscape, determine if repair or rectification works are required in these areas - remove trees and growth damaging the 1870s works in particular - provide safe secure access to the tunnel system preferably through the lower concrete portal, use a solid steel access door and remove existing brickwork which has evidence of break-in - limit access across the below ground areas - if access to the below ground area is required stabilise the timber beams under the concrete slabs	Monitor the site at the following times and frequency: - weekly or as required by NPWS for general site security - annually for maintenance review - regularly for vegetation management with general management of parkland - initially to determine conservation works
GAP BLUFF	Maintenance issues are: - removing undergrowth including grass on and immediately around the wall and the former gun emplacements to reveal the extent of the wall and its gunnery areas - remove growth around the base of the flag or signal mast	Monitor the site at the following times and frequency: - weekly or as required by NPWS for general site security - annually for maintenance review - annually for vegetation management with general management of parkland - initially to determine conservation works
GEORGES HEAD	Maintenance issues are: - clearing drains around and within the fortifications including rodding out lines where necessary - securing grates and covers - removing undergrowth from the WWII	Monitor the site at the following times and frequency: - weekly or as required by NPWS for general site security - annually for maintenance review - annually for vegetation

Location	Maintenance Needs	Monitoring
	structures - general cleaning of interiors of sites	management - initially to determine conservation works - annually to review previous conservation works - during heavy rain to monitor amounts of water entering the structures - after heavy rain and for the ensuing week to determine patterns of water movement
- 1871 beehive casemate group	Maintenance issues are: - keep clear entry stairs - clear drains as required to remove water from the building - monitor stone deterioration at embrasures - secure vent covers above	In addition to the above monitor the following features: - water movement within the building - render finishes - condition of gun carriage remains
- 1886 armoured casemate group	Maintenance issues are: - clear drains throughout the building and around the perimeter of the building - clear vegetation around building perimeter	In addition to the above monitor the following features: - render finishes throughout - water entry and movement
- 1942 WWII searchlight, lookout posts and gun positions	Maintenance issues are: - annually clear trenches and interiors of debris and rubbish	In addition to the above monitor the following features: - impact of adjacent bushland on structures
INNER MIDDLE HEAD	Maintenance issues are: - clearing drains around and within the fortifications including rodding out lines where necessary - securing grates and covers - securing entry to underground areas - removing undergrowth from the various structures including the WWII structures - general cleaning of interiors - formalising access tracks to commonly accessed areas - blocking access to areas designated not to be accessible	Monitor the whole site at the following times and frequency: - weekly or as determined by NPWS staff for general site security - annually for maintenance review - annually for vegetation management with general management of parkland - initially to determine conservation works
- 1871-1889 battery remains	Maintenance issues are: - clean rubbish and debris from within structures	As above
- 1889-1918 battery remains	Maintenance issues are: - clean rubbish and debris from within structures	
- 1940-1945 guns and observation posts	Maintenance issues are: - stabilising elements to prevent collapse or deterioration	
- 1871 fortified trench	Maintenance issues are: - prevent access to trench and wall area	
- fortified moat	Maintenance issues are: - control regrowth within structure	

Location	Maintenance Needs	Monitoring
OUTER MIDDLE HEAD	Maintenance issues are: - clearing drains around and within the fortifications including rodding out lines where necessary - securing grates and covers - removing undergrowth from the various structures including the WWII structures - general cleaning out of interiors - formalising access tracks to commonly accessed areas - blocking access to areas designated not to be accessible due to safety and other reasons	Monitor the whole site initially to determine conservation works and then at the following times and frequency: - weekly or as determined by NPWS staff for general site security - annually for maintenance review - annually for vegetation management with general management of parkland - during and after heavy rain to monitor water entry and movement throughout structures
- 1871-1882 battery remains - 1882-1892 modifications - 1892-1911 emplacements - 1912-1945 battery - post 1945 elements	The Outer Middle Head features are overlaid and difficult to separate in terms of maintenance works. Generally they require: - removal of plant growth from all structures - regular cleaning of all interiors and passageways - maintenance of handrails and metal elements - grouting of cracked concrete jointing - fencing of unsafe areas - removal of graffiti - removal of loose or fallen concrete elements around the site	See above
NORTH HEAD	Maintenance issues are: - removing undergrowth from the various structures - general cleaning out of interiors of accessible spaces - blocking access to areas designated not to be accessible due to safety and other reasons	Monitor the whole site initially to determine conservation works and then at the following times and frequency: - weekly or as determined by NPWS staff for general site security - annually for maintenance review - annually for vegetation management with general management of parkland
- 1941 Blue Fish radar	Maintain minimally as the site is largely a ruin and will continue to deteriorate with collapses of structure and destabilisation from adjacent undergrowth. Prop areas at risk of collapse, remove loose and dangerous elements that have failed. Block access to underground room.	Monitor weekly in case of collapse.
- Headland lookouts	No works are recommended.	Monitor monthly.
OBELISK POINT	Maintenance issues are varied across this site and are addressed more specifically in the sections below.	Monitor the whole site initially to determine conservation works and then at the following times and frequency: - weekly or as determined by NPWS staff for general site security - annually for maintenance review - annually for vegetation management with general management of parkland

Location	Maintenance Needs	Monitoring
- 1889 submarine miners observation post	Maintenance issues are: - clear debris and vegetation from structures	See above
- 1892 Nordenfeldt gun site	Maintenance issues are: - allow the site to deteriorate and prevent access	See above
- WWII Case battery features	Maintenance issues are: - remove from site accumulated rubbish from within structures - remove damaged concrete work at risk of detachment and falling - remove plant growth from within gun emplacement and from around entry to observation posts - remove damaged railings where risk of injury	In addition to the above monitor the features: - condition of concrete work to elements
SOUTH HEAD	Maintenance issues are: - clearing drains around and within the fortifications including rodding out lines where necessary - making safe concrete structures that are in advanced state of deterioration - removing plant growth from site features - general cleaning of interiors of sites	Monitor the whole site initially to determine conservation works and then at the following times and frequency: - weekly for general site security - annually for maintenance review - annually for vegetation management with general management of parkland
- 1871 battery and engine house	Maintenance issues are: - clearing drains around and within the fortifications including rodding out lines where necessary - removing plant growth from site features	In addition to the above monitor the features: - during and after heavy rain to ascertain impacts of waterflow and adequacy of drainage systems
- WWI AND WWII cliff edge structures	Maintenance issues are: - making safe concrete structures that are in advanced state of deterioration including removing sections of structures as required - removing plant growth from site features	In addition to the above monitor the features: - as required to monitor deterioration of concrete elements
- sandstone drainage moat and rifle post wall	Maintenance issues are: - clearing drains around and within the fortifications including rodding out lines where necessary - removing plant growth from site features - maintaining finishes to ordnance	In addition to the above monitor the features: - for vandalism
STEELE POINT	Maintenance issues are: - clearing drains around and within the fortification including rodding out lines where necessary - removing plant growth from site features - general cleaning of interior of site	Monitor the whole site initially to determine conservation works and then at the following times and frequency: - weekly or as required by NPWS for general site security - annually for maintenance review - annually for vegetation management with general management of parkland

Recommendations:

1 Ensure that a written record is kept of monitoring.

2 Establish a monitoring program for each site as set out above.

3 *Ensure that staff are trained to undertake monitoring and that it is reviewed on a regular basis.*

4 *Link monitoring to maintenance and conservation programs to identify future works.*

Figure xvi Membrane applied to roof of armoured casemate as part of previous maintenance works. Note the edge cracking and failure of the membrane through movement. Ongoing maintenance of areas such as this are essential to ensure that the fabric is conserved and that best value is obtained from conservation works.

Figure xvii Entry to Green Point tunnels (blocked) with extensive undergrowth that requires maintenance.

Setting and landscape surrounds

The various sites are located in a range of settings from maintained parks to coastal dunes, to heathland to regrowth areas with extensive natural vegetation. A central attribute of all sites is their relationship to the coast or the harbour with the facilities being sited at excellent vantage points offering, in most cases, spectacular views that at a number of sites attract high visitation. These settings also expose the structures and features to severe climatic conditions.

Each setting has varying management and maintenance requirements. There is no ideal setting and almost none of the present settings are historically accurate as photographic evidence suggests extensive clearing around the various sites and a relatively stark, austere and functional setting reflecting the military nature of the use. The current settings, set in bushland and often hidden from the harbour or in grassed parkland areas, are part of the current character of the National Park setting and should not be significantly changed. However there is a need to undertake some plant and undergrowth removal on a number of sites as set out in the table below. This is for maintenance and interpretation reasons.

All sites have the common element of intrusive planting on, within or immediately adjacent to the fortifications that have potential to adversely affect the built fabric.

Removal of plant growth is essential for conservation of structures. While there is always potential conflict between built and natural values there needs to be delineation around significant sites with a strategy of plant removal where it is seen to impact on heritage values or has potential for impact. There are numerous examples of deterioration of fabric as a direct result of inappropriate plant growth with even substantial concrete and stone elements being severely affected. A systematic program of survey and removal of:

- trees growing in or in close proximity to structures
- other plant growth that is deemed to affect structures
- root systems that are evident in below ground structures
- build up of soil, fallen limbs or debris around structures that is or is likely to have adverse impacts on the structures

should be undertaken and followed up by an annual inspection and assessment with a view to setting objectives for the following years work program.

Figure xviii Regrowth at Henry Head in areas of stone cutting that are causing serious deterioration to very significant stonework, to access and interpretation.

An area of difficulty is where parts of sites (usually sections of underground fortifications) have been infilled and where there is either no clear idea of what exists or what damage may be taking place. This is also the situation where there has been partial collapse of filled areas (for example as seen at the inner Middle Head emplacement). It is not proposed to excavate sites under this program but there is a need to undertake remedial action where sites have collapsed and there are access and OH+S risks as a result. These are matters of urgency and should be rectified immediately.

Most of this work can be done by NPWS staff provided that time is allocated to the activity.

Recommendations:

1 Undertake tree and plant removal to all sites as recommended as a matter of urgency.

Table iv Landscape Recommendations

Location	Landscape Recommendations
BARE ISLAND	Maintain the current landscape setting of grassland around the site.
BRADLEY'S HEAD	Generally maintain the current landscape setting noting that new landscape interventions have been added
- 1853 harbour front fortifications	Remove immature figs from stone joints Remove weed growth from stonework
- 1871 fortifications	Remove trees from the area immediately behind the firing wall to prevent further stonework deterioration
- WWII lookout and anti-aircraft gun emplacement	None
CAPE BANKS	Retain this site in its current landscape form, do not remove or add landscaping except as noted below.
- c1940 above ground remains – 2 9.2 gun emplacements	Remove weeds and invasive plantings from infilled gun emplacement
HENRY HEAD	Remove plant growth from the stonework elements of the installation to recover the open and bare stonework, particularly to the area behind the gun emplacements where the stone cut is found. Remove plant growth from the road area.
- 1871 battery with disappearing guns	Retain grass cover to the access area to the fortification. Cut back and maintain plant growth within the lower gun emplacement. Cut back and maintain growth over and onto the concrete elements of the fortifications.
- WWII Searchlights, gun position and lookout posts	Maintain current landscape without alteration.
GREEN POINT	Do not impact on the managed landscape setting of the park, however uncontrolled growth of weeds and trees around the below ground installation requires removal, management and maintenance. Remove trees (weed species including camphor laurel) immediately adjacent to the installation and the entry portal to prevent concrete deterioration. Also remove undergrowth, grass and weeds from pathway and uncover original path. Cut back weed growth from concrete areas to expose the structure and maintain. Remove grass from steps and features to provide safe access. Remove growth from concrete slabs and former defined sites for interpretation and manage the edges. Remove growth from base of obelisk.

Location	Landscape Recommendations
GAP BLUFF	Remove undergrowth from training wall and the area immediately to the east of the wall to provide clear and safe access. Remove grass and growth from concrete slabs and areas behind and adjacent to the wall to allow interpretation.
GEORGES HEAD	The landscape extends around and over the various features and is largely regrowth landscape from a once cleared site. Apart from the now obvious and exposed roof of the armoured casemate, features are not readily seen unless at close quarters. This should be maintained.
- 1871 beehive casemate group	Remove build up of material and growth from the top of the ventilation shafts. Ensure water does not drain into the vents.
- 1886 armoured casemate group	Remove perimeter growth from drains and edges, clear all drainage areas to ensure water flow away from the building. Remove growth from stonework areas. Cut back growth around adjacent structures as there is risk of future damage. Remove tree growth from water reservoir internally and in immediate vicinity. Remove weeds from pavement areas.
- 1942 WWII searchlight, lookout posts and gun positions	Retain the current heavily treed character but remove selectively branches or growth damaging structures, growing out of walls or blocking drains etc.
INNER MIDDLE HEAD	This site is largely overgrown but well-accessed resulting in unwanted patterns of movement and impacts on vegetation. There has been bush regeneration activity adjacent to the site but no management of the ruins. The following sections address specific problem areas.
- 1871-1889 battery remains	Remove invasive planting from walls, edges and from the concrete and stone elements. Clear established accessways and remove plant growth. Remove branches and debris from tops of vents and clear vent areas. Adjust ground levels if required to redirect water from vents. Remove growth from infilled gun emplacement, stabilise and grass.
- 1889-1918 range finding station	Remove growth from within structures. Remove immediately adjacent trees where risk of collapse will damage the structure. Remove branches and debris from tops of vents and clear vent areas. Adjust ground levels if required to redirect water from vents. Clear build up of soil and debris from around structures.
- 1940-1945 guns and observation posts	Remove immediately adjacent trees where risk of collapse will damage the structure.
- 1871 fortified trench	Remove plant growth from stone wall and walls of moat, remove growth impacting on the structure.
- fortified moat	Selectively remove growth from within the moat and manage as a minimal landscaped element.
OUTER MIDDLE HEAD	Outer Middle Head is perhaps one of the most maintained sites in the group with high levels of visitation and good site management. Despite this there is considerable regrowth on the structures that requires regular attention. There is very little encroachment of vegetation with the exception of the entry to the engine room and around former building sites.
- 1871-1882 battery remains - 1882-1892 modifications - 1892-1911 emplacements - 1912-1945 battery - post 1945 elements	Remove all plant growth from cut stone and concrete features, from cracks, base of structures, around stairs, etc. Remove grass from within structures and recover stone base levels. Remove plant growth around entry to below ground engine room area.

Location	Landscape Recommendations
NORTH HEAD	
- 1941 Blue Fish radar	Remove trees from tops of mounds, stabilise after removal.
- Headland lookouts	Retain in current form.
OBELISK POINT	This is a broad landscape setting linking a range of spread sites with a range of landscape management issues that relate to unplanned access, unwanted regrowth, erosion, etc. Each of the settings is addressed below in terms of immediate landscape management. The broader management relates to future use and access but requires a planned and constructed access to key sites to protect the landscape and to allow adequate landscape management of the area.
- 1801 battery	Remove growth from the interior of the fortification and the accessway, stabilise the area and grass with native grasses to provide access to the public. Remove growth from rock areas. Provide an access path as discussed elsewhere.
- 1889 submarine miners observation post	Clear immediate growth from the structure but not around it, do not provide access.
- 1892 Nordenfeldt gun site	Retain in current form.
- WWII Case battery features	Remove growth from within the structures, from access stairs and paths and plants immediately against structures.
SOUTH HEAD	
- 1871 battery and engine house	Remove weeds and growth from excavated accessways and from stone walls. Remove overhanging branches from accessways. Remove growth from within fort structures.
- WWI and WWII cliff edge structures	Retain in current form.
Location	Landscape Recommendations
- former pathway and structures along cliff edge inner harbour	Retain in generally current form, ideally remove invasive weeds and plants as general site management.
- sandstone drainage moat and rifle post wall	Retain as current form, remove minor weed growth.
STEELE POINT	Remove growth on and around tunnel portal. Remove grass and weeds from fort area.

Accessibility, Security, Potential for Public Access

The sites range in their accessibility both in terms of actual accessibility and desired accessibility to the public. Access is available to most fortification sites for visitors to walk around and see what remains at surface level: some sites have organised tracks and routes that promote access, others are located in parks or areas that allow access, some are remote and in bushland without formal access but have informal tracks, others are not readily locatable and proved difficult to find in the study.

The only site (apart from secure underground areas) with secure access is Bare Island which is not accessible without permission. Due to its location and formation unauthorised access is difficult but continues to occur on a frequent basis.

As all of the sites are within National Park land control of access is difficult, even at night, as it is possible to walk into almost every site.

The sites currently falls into three groups:

1 Managed access with formed path access, some interpretation, some tours, often protective fencing and generally in a well-managed setting.
   - Middle Head - Outer fortifications including some subterranean areas but not all site elements
   - Georges Head - casemates (tours only when available)
   - Bradley's Head – above and below ground fortifications of two fort locations
   - Bare Island – tours only
   - South Head – above ground works only

2 Site within managed parks but not the major focus of the park but with access as part of the park or through walking tracks
   - Middle Head - Inner fortifications with limited below ground access
   - Georges Head – Second World War fortifications
   - Henry Head – above ground features only with access from coastal walking track
   - Steel Point – above ground fortifications only, accessed from park
   - Green Point - above ground fortifications only, accessed from park
   - Gap - above ground training wall accessed from park

3 Remote sites where access is not encouraged where sites are secured, where there are not access paths and where the area is not managed.
   - Cape Banks – above ground sites which are accessible but access is not encouraged and below ground sites which are not accessible
   - Sections of North Head – Blue Fish, cliff fortifications (one area recently opened to access but not a suitable public access area)
   - Sections of South Head – cliff fortifications
   - Middle Head – inner fortifications located in bushland and underground elements
   - Middle Head – outer fortifications along the cliff edge
   - Obelisk Bay – all sites in bushland with rough tracks and no planned or formal access

Access should be closely linked to safety, risk management, condition, ability to be managed and the nature of the feature. Generally the following policies should guide how access is undertaken, managed or changed.

Recommendations:

1 *Each site requires an assessment (as set out in this plan) prior to changing access arrangements. Only sites that can accommodate visitors within the framework of risk assessment should have increased or promoted access.*

   Risk is commensurate with setting, ability to be accessed, the nature of the surrounding risk (for example if it is part of cliff top works which are not otherwise protected and is remote and is not promoted) and site condition.

2 *Where access is intended and planned it should be provided with safe and clearly marked access routes to those parts of the site that are planned for access.*

3 *Where access is not desirable strategies such as bush re-generation, blocking of access by fences and other barriers should be employed to clearly indicate that access is not available.*

An important discussion relates to the level of safety that should be provided at sites such as the fortifications which are by their nature ruins and not accessible buildings or structures under the various building codes. NPWS have over time looked at the nature of risk at a particular site and where considered appropriate, addressed it. This is a sound principal and should be followed in future considerations irrespective of regulations.

If a strictly technical approach was taken to these sites with risk assessment it would be possible to mount an argument to prevent any public access as there will be extensive non-compliances and perceived risks at every site, structure, feature and cliff top. A more suitable approach is to consider the sites as part of the surrounding National Park and to consider risks in terms of general access to park areas. Here there is a reasonable assumption that visitors when entering a natural area will encounter some risk and will make judgements as to how they will handle it or where they will go. For example in areas of extensive escarpment and cliff top it is reasonable to expect that a visitor if accessing a cliff top area will take care as it is a natural feature. However an identified lookout with an access path will be expected to have a fence to provide protection in recognition of the higher visitation level. The same argument applies to the forts. In high access areas where there is a particular risk identified it needs to be addressed. Examples of this are at Gap Bluff where an edge fence is provided for the full length of the area as it has high levels of visitation, a narrow access way and a clear high level of risk to visitors. Another example is Bradley's head where a simple timber railing is provided around the early fortification edge which is used as a walkway by many people with very easy visitor access. This is not a complying fence in terms of codes but identifies an edge, a risk and provides a barrier. Within the whole setting where risks of access are high this is a suitable marker and device.

The use of signs to make visitors aware of risks is also important and is addressed under the section on OH+S and in particular in the recommendations.

Areas where protection is not adequate are sites of high visitation at defined times such as major public holidays where crowds assemble and edges in particular are vulnerable. These have been addressed by temporary fencing, often of star picket and tape design, which while an effective deterrent does not provide a safe setting.

Set out below are some principles of access and assessing risk, they are predicated on the following:

Figure xix Outer Middle Head showing a location where secure fencing is required as it is easily accessible and the drop-off is unexpected and dangerous. While the fencing is not complete in that it does not return, it marks a dangerous location adequately to warn visitors not to proceed past the edge of the fence. This is an excellent example of when to provide barriers. In contrast, the chain to the left of the picture is a handrail down a steep set of steps and it is not a suitable element and should be removed as it presents a danger to users in itself.

Figure xx Outer Middle Head showing more recent fencing that is properly placed at the top of the rise to prevent casual access to steep slopes. It does not prevent access but provides a suitable indicator to prevent a visitor from accidentally accessing a difficult area. While the form of fencing is not sophisticated, it is low key and works well.

Figure xxi Outer Middle Head showing the extensive network of tube rail fencing installed in the past to protect visitors, however while some edges are fenced most are not. The fence in the immediate foreground for example protects a low drop-off, but other gun emplacements do not have fencing with a similar drop-off. Inconsistencies in approach may expose NPWS to claims as this fence clearly recognises a risk and that should be applied consistently. A better approach would be to remove some of this fencing and to only provide fencing where risks are high.

Figure xxii South Head adjacent to Hornby Light showing the difficulties of unprotected access to cliff top features. This is a highly visited location that is used for many photographs and has high risk due to the dangerous behaviour of visitors. Here consideration of a barrier, possibly low and behind this popular photo location would reduce risk.

- not all sites are considered to be accessible, many sites should have no attempt at providing safe access or protection as access is not encouraged
- the level of assessment directly relates to the type of visitation, for example sites with organised tour visitation (coaches) with a range of visitors from young to elderly require defined access routes and paths with safety where a guided walking tour of an area (with NPWS staff) with managed access will require minimal safety provisions due to the nature of the access.
- the sites are ruins and should always be managed as ruins with their inherent character and risks
- all sites with intended access should be signed to identify the level of risk

Principles of Access and Protection

1 Assess all locations for the level of access planned and actually taking place and develop the risk assessment based on actual and planned usage.

2 Identify specific risks (such as for example a difficult to see drop off or change of level in a key location) and provide specific low impact solutions.

3 Identify occasional risks from large functions or events and develop responses that can be temporarily installed

4 Provide safe access paths through key sites and encourage their use rather than random access arrangements.

5 Actively block any dangerous location or accessway.

6 Do not increase the overall level of protection provided to sites but address specific issues were there is a recognised and preventable risk in frequently accessed areas.

7 Develop standard design responses to provision of handrails, barriers and other devices that identify across all sites that they are barriers with no access. Design them minimally to avoid visual intrusion into sites. Design them as deterrent barriers and handrails but not complying fencing or balustrading.

8 Develop standard signs warning of identified risks, adopt a policy on location of signs around fortifications.

Table v Current Access, Security and Site Risk assessment

Location	Current Access and Security	Observed Risks	Recommendations
BARE ISLAND			
- access bridge	Publicly accessible at all times for pedestrians. Restricted access to NPWS and service vehicles to the island. Security is not required.	Deterioration of structure causing possible bridge failure	Retain current access arrangements. Undertake scheduled bridge repairs.
- 1871 and onwards fortifications as a whole on the island	Bare Island is secured and not generally available for public access unless through guided tours. At the time of this report tours were not being held due to staff shortages. A caretaker lives on the island to provide security in part of the barracks building, the accommodation is basic. The site by its nature is secure.	The site has few risks that appear unacceptable. Pipe railings require upgrade or replacement and reassessment for location.	Bare Island is one of the key sites for public access and should have a high level of organised access in a range of forms. This requires management, staffing and expenditure. It also requires an access strategy that identifies opportunities within the constraints of the control documents and

Location	Current Access and Security	Observed Risks	Recommendations
	and access is difficult without approval although staff report regular illegal access, particularly after hours. This access has included damaging security cameras mounted above the entry. Within the site some areas are secure but generally the site is open		management plans for the region. Security needs to be upgraded to protect the site and staff. Improved fencing and gates, security cameras and lights and potentially guard dogs could be employed. An active presence on the site is important to achieve satisfactory security.
- 1889 barracks building	The lower level is used for caretaker accommodation, the upper level is vacant but secured. The use is practical at this point, however the fitout is marginal for occupation and requires upgrade.	None known	Explore other options for access that may return some funding to the site, e.g. dive school.
BRADLEY'S HEAD	The whole site is open to the public with all features accessible both above and below ground. Security is maintained at night with the park area access road being closed, pedestrian access is still available. There is no on site security to specific areas.	Generally the site has low risks and is well managed.	With its high level of visitation and good management and maintenance the site appears to work well in unrestricted form. There appears to be little damage or vandalism.
- 1853 harbour front fortifications	This is an open structure which has high visitation and access.	Areas along the cliff edge were temporarily fenced at the time of inspection suggesting a hazard that may need to be addressed	Retain in current form. Look at fencing of access to wharf area.
- 1871 fortifications	These features are fully accessible with some underground areas not lit but accessible	Risks are managed well, some lighting to below ground areas may be required.	Retain in current form, consider adding solar powered lighting to the underground areas to allow better visitor access as one of the few easily accessible underground fortifications complexes that are fully accessible.
CAPE BANKS	Cape Banks is not intended as a planned public access site but is located within the National Park which allows access even though relatively remote. Recent construction of the heliport immediately adjacent to the gun positions and between the guns and the observation post has opened up the site and made it more obvious and more easily accessible. This is unfortunate.	Risks are related to access to below ground areas, dangerous deteriorating fabric, risk of falling down exposed shafts. There is potential risk of contamination from below ground areas.	Retain the site as a non-managed low key site with access available to above ground areas but no access below ground. Staff access needs to below ground areas should be minimised and strictly controlled due to possible risks of contamination. Remove risks by improving security.

Location	Current Access and Security	Observed Risks	Recommendations
	Currently the site is managed as a closed below ground facility with open access to the remaining above ground fort elements.		
- c1940 above ground remains – 2 9.2 gun emplacements	The above ground elements have been extensively vandalised, are in poor condition and are dangerous. It is not possible to easily secure them from access. The above ground rooms are full of rubbish and demolished materials and are dangerous as they are accessible. The engine house is intended to be closed but is open through a failed steel window.	Risks are dangerous materials and rubbish.	Retain the above ground elements as accessible but do not encourage access. Remove all rubbish from buildings and remove failed steel doors and projections to make the site safer and leave the buildings open. Secure the engine house by replacing the steel window.
- c1940 below ground remains – engine room and magazines	Many of the access points to tunnels and shafts have been opened through removal of gratings and doors, cutting of locks and various other means. Most underground areas were open at the time of inspection and could be easily accessed. The below ground areas are not safe, potentially contain materials such as asbestos and need to be secured to prevent any access.	Risks are access, contamination, possibility of falling into shafts.	Security is a major problem on the site due to remoteness and relative ease of access through many points. Security must be upgraded significantly to prevent access as there is high risk associated with the site. If necessary filling shafts or areas with sand to prevent access may be necessary with very limited secure access points, these will need substantially greater security measures. If required an aggressive approach to security should be taken including removing vulnerable vents or structures.
- c1940 observation posts and control rooms	There are three structures on the hill overlooking the gun emplacements. They are accessed from a road to military accommodation. The small engine house is used as part of the housing group. The structures are not obvious which assists their management but they are accessed as evidenced by the cut bolts on the access door to the plotting room.	Risks are failed materials, access and contamination.	Security to the observation building is not feasible. It should be cleared of any debris and left open to access. In time it will fail structurally. The below ground elements are in good condition but need to be better secured to prevent entry. Bush regeneration around the features should be encouraged.
HENRY HEAD	Henry Head is located on a walking track and is a prominent location with good views. Access to the site is desirable but access to underground areas is not safe in an uncontrolled way. The site is in three parts the 1871 fort, the WWII	Risks are collapse of concrete structures and damaged metal fabrics.	Generally the level of access to the site is reasonable and the amount of accessibility is appropriate for the location, the remoteness and the ability to manage the site.

Location	Current Access and Security	Observed Risks	Recommendations
	emplacements on the cliff edge and the observation post on the hill behind. There appears to be little vandalism possibly due to the relatively long walk to access the site and the lack of road access.		There is limited access into the structure but not to the tunnels and lower gun emplacement.
- 1871 battery with disappearing guns	Partially accessible with underground areas generally secured, the site was secure at the time of visitation. Apart from vegetation the site was clean and appeared well managed.		The level of access is appropriate however clearing will assist safer access to open parts of the complex (see maintenance). Security appears adequate.
- WWII Searchlights, gun position and lookout posts	Fully accessible.	Most of these features are severely deteriorated and will present a risk in the future.	A general clean up of failed material is desirable and in time partial or full demolition of elements will be required. The current access arrangements are satisfactory in the interim.
GREEN POINT	Green Point is set within a park on the harbour edge that is well accessed and generally well-managed. The below ground features are not accessible. The site visit required removal of a sandstone capping to a shaft and ladder access. The previous visit by PWD staff had been a number of years earlier.	Minimal risks above ground.	Apart from site maintenance works retain the site as a low key site without access and general park access to the above ground areas.
- 1871 -1885 battery	Little remains of this battery. Refer to comments below for the remaining complex.	See below	See below
- post 1892 battery	Apart from an entry portal (bricked in), a pipe extending into the harbour and areas covered by dense vegetation the site is below ground and not accessible. There is little to suggest a fortification on the site. The below ground areas are not suitable for access without significant upgrade as there is no safe access along tunnels and sections of timber formwork are collapsing. Site security is reasonable although there is evidence of earlier break-ins in damaged brick infill panels.	Managed access for staff has manageable risks.	Maintain the site as non-accessible. For future maintenance consider replacing the bricked in entry portal with a secure steel access door to allow safe staff access.
- WWII anti-submarine features	These are remnant elements with one small brick structure that has had brickwork removed to allow access.	No known risks.	Reinstate missing brickwork and retain non-accessible.
GAP BLUFF	Gap Bluff is a fully accessible site as an extension of the Gap walking track. It is not a formed track along	No known risks.	Maintain the current access pattern as an unformed but cleared track, do not

Location	Current Access and Security	Observed Risks	Recommendations
	the wall but it is a well-established track. Access to the fortification is incidental to the visitation of the Gap. Security is not an issue however safety is potentially an issue with the proximity to the cliff edge and high visitation.		formalise access.
- 1912 gunnery training wall	An unformed track extends along the front of the wall between the wall and the cliff edge. A fence protects the cliff top.	No known risks.	For maintenance the wall area should be cleared but also to provide ease of access to visitors.
GEORGES HEAD	The two underground sites are secure and only accessible through tours. The WWII site can be access externally but underground areas are not available for access. Overall the site is well-managed and maintained in safe condition. Security appears to be well-managed with no evidence of break-in or failure of systems.	Risks are generally well-managed particularly to regularly accessed parts of the area.	The two underground sites (with Bare Island) are the sites of greatest potential for access and interpretation. However they require careful management and should not be available for un-restricted access. The Georges Head sites are relatively safe, easy to access and have good security.
- 1871 beehive casemate group	The site is only suitable for managed tour access and requires minor safety upgrades to facilitate this.	Risks relate to condition of pavements and lighting of paths.	Work is required to repair damaged pavements to make the place safe for access. Only tour or managed access should take place with limitations on visitor group size based on ability to vacate the area in emergency.
- 1886 armoured casemate group	The site is only suitable for managed tour access and requires minor safety and maintenance upgrades to facilitate this. The timber ceiling framing and some wall plastering needs to be secured prior to further access. Temporary shoring has been installed to protect failing plasterwork, this impacts on the visitation experience. See conservation work section.	Minimal risks relate to trip hazards and at present risk of falling timber from ceiling and plaster from walls.	The site is highly suited for easy tour access but requires rectification of timber and plasterwork. The site presents minimal risks only for access commensurate with the nature of the site. Apart from routine maintenance and adequate lighting the site is suitable for all grades of tour access.
- 1942 WWII searchlight, lookout posts and gun positions	These sites are located in regrowth areas and accessed by a bush track. They are not maintained or managed except as ruins and are secured to prevent below ground access. The security appears adequate and there is minimal evidence of vandalism or break-in attempt.	With their present access the site have low risk.	The present access to these areas is appropriate, underground access is not desirable. Security should be maintained and access should continue as a low key bush track route.

Location	Current Access and Security	Observed Risks	Recommendations
INNER MIDDLE HEAD	Inner Middle Head is an abandoned set of sites with some access from an early road alignment that is now a walking track. The remains of the 1870s and 1890s battery are accessed off informal tracks with unrestricted access to the above ground areas, the remaining gun emplacement but not the tunnel and underground system. All of the adjacent sites are accessible with the range finder station open for underground access. A number of sites are in thick bushland and are not accessible, Other sites are off the track but accessible across bushland. The defensive ditches traverse the area and the main ditch extends as a wall to the cliff edge where it in partial collapse and an access track extends across it causing ongoing damage. There has been bush regeneration in the area that does not appear to relate to the historic structures. Several sites are on the cliff edge and are potentially dangerous. Overall the access track which leads to the cliff does not formally connect to other tracks resulting in various routes being taken across the battery area. Access routes are consequently not planned and in places dangerous.	There are risks associated with possible access to underground areas that are usually secured, trip hazards from unformed paths and dangerous access points and some risk from the unprotected edge adjacent to one WWII observation area.	The area contains very interesting and relatively easily accessible sites that forms part of the broader complex of Middle head. The area is heavily accessed with random tracks evident around the main site features. Opportunities exist to enhance access, create intentional access routes and paths that provide safe access to key elements and to more actively link this area to the outer fortification zone. Some tracks need to be blocked, revegetation can assist in relocating access and some sites should be non-accessible.
- 1871-1889 battery remains	This is in three parts, the remaining open emplacement, the infilled emplacement and the underground tunnels and rooms. The remaining emplacement is open and accessible and regularly accessed. It requires better track access to prevent damage and make the place safe. The infilled emplacement is severely eroded and allows easy access into the underground tunnel system. There is effectively no security at this location. Options are to provide gated access to the tunnel, fill the subsided area or to excavate the area and provide security. The area is a hazard in its present form and requires rectification. The below ground areas are very fine and interesting and have high potential for public access. However clearing work is required to the main entrance to provide easy access. This would also assist	Risks relate to illegal access to underground areas.	The battery has high potential for public access. This could be achieved in several ways. After minor clean-up works the tunnel system could be accessed by tours or opened for restricted times for more general access. This underground system is one of the easiest to access and one of the most interesting to explore, it is reasonably well lit and this could be enhanced with solar panels. The tunnels should be secured as a priority to prevent unwanted access. The infilled pit should ideally be excavated to provide better access, however this is not a priority. The site should be made safe by filling or limited excavation to allow

Location	Current Access and Security	Observed Risks	Recommendations
	conservation.		light into the end of the tunnel system.
- 1889-1918 range finding station	This site is of great interest and one of the few underground elements that is freely accessible in a low managed area. The structure is robust, presents low risk and should be retained open to allow visitors the sense of discovery. Ideally it should not have upgrade access but could have some interpretation.	There is minimal risk related to this structure.	Access to this structure should be maintained in its current form with low key track access and no external signage.
- 1940-1945 guns and observation posts	These are robust structures of concrete that overlay the other sites. They have reasonable access although one is near the cliff edge. It is accessed by steps. Ongoing access to these structures is desirable as part of the Middle Head complex.	Risks relate to proximity to the cliff edge of the access path which may need to be fenced.	The current access to the two main structures at the end of the access track are adequate and provide good public access. Other remote structures should not be accessed. Sites off the main track should be allowed to slowly deteriorate as ruins and should not have access encouraged.
- 1871 fortified trench	This is now overgrown and extends along the track alignment. It is not accessible but is visible and appears to have been partially filled.	There are no know risks.	Sections of the trench could be cleared to provide access and interpretation. Generally the trench should be cleared as part of maintenance.
- fortified moat	The moat is a major element that extends into a wall. This wall is collapsing at its outer edge and is used for access to the cliff top. This is dangerous and damages the remaining wall.	There are no known risks apart from unplanned access at the collapsed section of wall.	Access across the end of the wall should be discouraged with stabilisation of the wall end to prevent further loss of material. Generally the moat should be cleared and where filled preferably excavated for its full length as an interpretive device. Access to the ditch could be provided.
OUTER MIDDLE HEAD	Outer Middle Head is a substantial installation with many layers. It comprises above and below ground areas, steep drop offs, edges, stairs, embankments, escarpment edges, etc. It is an intrinsically dangerous area if the visitor is not made aware of potential hazards, however, given the level of site maintenance, provision of safety barriers at key locations and the setting which provides no protection along cliff tops, the site is considered to have an overall low risk. Risk has been recognised in the past in terms of the type of visitation	Risks are generally managed appropriately, minor areas of risk are: - maintain fencing and rails in good condition - securely fence off areas not suitable for access - prevent access to WWII structures generally in this area as they are failing - maintain security to underground areas	Provide a self-guided tour that sets out a safe access route around the site for visitors. It is important that it is noted that other areas should not be accessed without care and have risks for unaccompanied children and and people with disabilities. Standardise fencing and railing design. Replace fencing over time with a new design. Provide signage.

Location	Current Access and Security	Observed Risks	Recommendations
	that takes place and an extensive system of simple pipe handrails has been installed to protect edges from unfamiliar visitors, to provide rails to walkways and stairs and to generally provide a secure access way through the site. Not every edge or step is however addressed. Such an action would neither be feasible or desirable as the intrinsic value of the place as a ruin would be at least in part destroyed by over-protection.	- prevent access to the WWII cliff edge locations with secure fencing	
- 1871-1882 battery remains - 1882-1892 modifications - 1892-1911 emplacements - 1912-1945 battery - post 1945 elements	See above	See above	See above
NORTH HEAD			
- 1941 Blue Fish radar	Three of the five sites are accessible with new access paths, stairs and boardwalks, the new steps have minor non-compliance issues and trip hazards. The sites have defined access but access onto the structures is easily available with drop off heights in excess of a metre. Some areas have potential for collapse.	Potential collapse of areas of the structure. The steps and below ground room which is subject to flooding (it is barricaded but access is not restricted).	In the longer-term restrict access to deteriorated areas. Make safe current access ways. Restrict access to below ground area with a steel gate.
- Headland lookouts	Access is only provided to one structure behind secure fencing.	There is no observed risk with these structures in their current forma and with secure fencing.	None.
OBELISK POINT	Obelisk point contains a number of sites spread around the cliff top with several at the cliff base, various rough access tracks extend from the carpark and via a service track, tracks are roughly signed but wander giving no clear or safe access routes. The overall impact of the tracks is the degradation of the bushland and potential damage to structures.	Risks relate to access and the potential for visitors to get lost or go too close to the cliff edge.	Create a managed path system as part of a larger strategy of access across the Middle Head sites that links the main sites in a safe and planned way.
- 1801 battery	Access is available to the site via a network of rough tracks around the cliff top, however no safe access is available.	Risks relate to difficulty of access and the poor quality of tracks that lead in some locations to the	A formed and managed access path should connect the battery to Middle Head and Georges Head also accessing other sites at

Location	Current Access and Security	Observed Risks	Recommendations
	Access is desirable due to the high significance of the remains. Security is not required.	Cliff edge.	Obelisk Point. The path should include clearing the ramped access into the fort and the overgrown base of the fort area for managed public access
- 1889 submarine miners observation post	This forms part of the main area that can be access from bush tracks. Security is low but adequate.	Cliff edge.	As noted above, these elements should be included in planned access arrangements.
- 1892 Nordenfeldt gun site	This is a minor site that does not require planned access	The site should not be accessed and regrowth should be allowed.	Do not connect the site to new paths.
- WWII Case battery features	Access to the site is available but not to below ground areas, security appears sound except for a broken access grille to the observation building.	Risks relate to unplanned access to secure areas and steel elements stored in the buildings.	Generally the areas should retain external access with some limited clearing to make safe. Security should be upgraded and monitored to enclosed areas.
SOUTH HEAD	Generally the site is well secured and access is provided to above ground areas but not to below ground areas except on an arranged access basis. The newly discovered engine room is not accessible except by ladder. The site is well managed although several risks were identified during fieldwork.	Generally there are few risks and the site is well managed. Specific risks are noted below	Provide protection as recommended, create new access routes and block dangerours access to the escarpment and provide safe access to edge structures or block all access.
- 1871 battery and engine house and associated elements along the cliff top and edge	All of these features are well managed the only obvious risk being the cliff top site that is subject of many tourist photographs were there is risk of falling from unsafe behaviour of tourists. Below ground access is very secure and well managed.	Climbing on walls for photography etc places visitors at self-imposed risk. The engine room with its current ladder only access down a shaft presents OHS issues for safe access. In the future this should be rectified by reinstating internal access (with lockable door if required for management) to avoid the need for ladder access into restricted spaces. This is access for staff and management and is not intended for public access unless the area is properly	Investigate low key protection for cliff top structures that have high visitor access. Provide underground door access to the engine room to eliminate ladder access. Manage balance of installation as currently managed.

Location	Current Access and Security	Observed Risks	Recommendations
		prepared and forms part of an approved interpretation plan.	
- WWI and WWII cliff edge structures	These structures extend from the cliff top to base with a number being located on the cliff face. They are in poor condition and access is via steep tracks down the cliff edge. The sites are not secured and do not require security.	Risks relate to the unsafe nature of the various access tracks and the potential collapse of several structures due to structural failure.	Access to these areas should be limited and discouraged, it will not be feasible to prevent all access. As structures deteriorate and become dangerous they should be removed in part or in whole. All at risk structures should be recorded. It may be necessary to fence areas to prevent access to minor installations and revegetate current worn unplanned access paths. Alternatively create formed access path to main harbour ruin, make safe and close all other routes.
- former pathway and structures along cliff edge inner harbour	The remains of an early pathway and lookout positions are found along the inner harbour frontage. Access is from a boardwalk or the access road. Access is discouraged but tracks can be seen across regrowth areas. The structures are of interest. The remains of the walking track are below the current road but easily accessible.	Risks relate to the walkway which in part is dangerous and access off established boardwalks	Retain in current form.
- sandstone drainage moat and rifle post wall	Access is via an established walking track with good access in and around the various features. Security is not required and the area is generally accessible to the public.	Risks appear minimal and are well managed.	Retain in current form.
STEELE POINT	Steel Point has general public access as part of the parkland in which it is located but does not have below ground access. The current level of access is appropriate and safe and the site is well managed. Security is maintained to access points.	Risks appear to be minimal and well managed.	None.
- 1871 and later fortifications	See above	See above	See above

Access and Visitation

Separate to considerations of safe access and good site management are considerations of what type of access is desirable in the future to various sites to facilitate interpretation, tourism and good public access. The following table looks at each site in more detail with recommendations for specific access strategies and requirements. Some of these relate to proper functioning but are mostly looking at strategic issues of access with a view to making sites more user friendly, raising patronage levels and potentially creating programs that 'value-add' the visitation experience.

The key strategy of this report is to focus activity, visitation, programs, on several core sites, Bare Island and the Middle Head group. However all sites have visitation and require strategies to extend, limit or improve that experience. Given that a number of sites are isolated, remote and difficult to manage on a day-to-day basis good site access, particularly to below ground areas, can only be provided at several core sites. Other sites retain interest and can have visitor experiences enhanced.

Sites such as South Head and Bradley's Head have high visitation and seasonal event visitation which is unrelated to them being fortification sites. This provides interpretive opportunities related to their use as forts.

General recommendations for improving access and the experience of the sites include:

1 Ensure that the ruined and remote character of many sites is retained in any upgrade works related to access or safety. It is not intended to sterilise sites but to subtly enhance their character by careful site management.

2 Ensure that access paths are safe within the standard of path provided. This will vary between locations from formed concrete paths in major parks to bush tracks along headlands. The major issues arise within sites where changes in level, undergrowth and failed materials make access difficult. Basic maintenance and a strategy for each site based on desire routes for visitors should guide decision-making. Generally, within the fortification sites, boardwalks, new stone structures such as steps or walls, sealed paths, etc are not appropriate ways to provide access as they are intrusive. These materials may be used on linking paths between locations.

3 Ensure that where access routes are provided that they are clear, they go to the desired locations without obvious short-cuts, are signed and explained, they do not adversely impact on heritage values and are subtle and largely not noticeable in their design.

4 Most sites will not have complying access for the disabled. It is not possible and not reasonable given the location and form of sites. However the core sites should have access for the disabled provided to at least key areas. This should be indicated and managed.

5 Heavily visited sites in particular need access for a range of visitor types so that they can be widely accessed. Degrees of difficulty of access need to be advised. Other sites should not attempt to provide specific forms of access for particular user groups.

6 Heavily visited sites should have a hierarchy of access routes reflecting traffic flows and levels. This means providing different types and qualities of access paths depending on the level and need for visitation.

7 Major sites should have clear access strategies for arrival at the site (vehicles and walking), parking, tour groups, provision for visitors with disabilities, provision of site information, organisation of formal and self-guided tours, provision of amenities, etc.

8 Major sites should have on-site signage that identifies the site in the context of other harbour fortifications.

Figure xxiii The main walking track between the Inner and Outer fortifications at Middle Head with the informal linking track to the right of the retaining wall that visitors are required to find and use to complete a circuit of the area. The informal track is not suitable for general access, traverses the top of sensitive areas with below ground fortifications, is difficult to locate and is confusing to irregular visitors. Apart from general track maintenance, a clear route needs to be provided that is safe and without hazards.

Table vi Existing and Proposed Access Strategy

Location	Current Status	Proposed Access Arrangements
BARE ISLAND	Managed or restricted public access to the island has been available but presently it is closed due to staff shortages. Site signs indicate that tours still operate. As the site is secure. access has been by tour or open day which is generally managed access.	Provide managed Public Access on a regular basis as an interim measure and develop an access strategy as a key fortification site linked to interpretation. Make the site accessible to organised tours, open days and potential for other uses that activate the site.
- access bridge	Unrestricted access	Unrestricted access
- 1871 and onwards fortifications as a whole on the island	Managed or restricted public access.	Managed access. Potential for more general access on limited basis.
- 1889 barracks building	Managed or restricted public access	Managed and restricted access
BRADLEY'S HEAD	Currently unrestricted Public Access to all areas including small underground areas in the 1871 structures.	Maintain unrestricted Public Access to all areas.

Location	Current Status	Proposed Access Arrangements
- 1853 harbour front fortifications	Unrestricted Public Access to all areas	Provide additional secure fencing to non-accessible site areas.
- 1871 fortifications	Unrestricted Public Access to all areas	Maintain unrestricted public access as at present.
CAPE BANKS	Currently unrestricted Access to above ground areas. No access to below ground areas allowed but access is achieved by vandalism. Access generally is discouraged but recent development works have made the site more accessible.	Maintain the current restricted access arrangements, make underground areas more secure and discourage all access to the site in the future. This is the least suitable fortification site for public access.
- c1940 above ground remains – 2 x 9.2 gun emplacements	Access to above ground area available.	Make safe and continue low level access but noting that access is to be discouraged.
- c1940 below ground remains – engine room and magazines	Maintained locked but extreme vandalism has made most areas accessible.	No access at all to be provided, site not safe, provide whatever security is required to prevent access.
- c1940 observation posts and control rooms	Above ground access available but difficult to locate, below ground access not available except through vandalism	Retain above ground access, secure below ground access as noted above.
HENRY HEAD	Currently unrestricted Access to above ground areas is available from a formed walking track. No access to below ground areas is available to the public. Access to main rooms at ground level is available through debris and undergrowth.	Retain unrestricted access to above ground areas. Retain no public access to below ground areas. Retain access to main rooms at ground level, clear to make safe. Continue as remote managed site with occasional access from walkers only.
- 1871 battery with disappearing guns	Partially accessible.	Retain current level of accessibility.
- WWII Searchlights, gun position and lookout posts	Generally accessible.	Retain current level of accessibility.
GREEN POINT	Unrestricted Access to above ground areas currently available as part of general park access. No access to below ground areas available to public, difficult staff access through ladders.	Retain unrestricted access to above ground areas. Retain no access to below ground areas, consider upgrading staff access to below ground areas by reinstating access door in existing portal. Retain area as park with fortifications as elements but not major features.
- 1871 -1885 battery	Below ground not accessible, above ground elements accessible.	Retain current level of accessibility.
- post 1892 battery	Below ground not accessible, above ground elements accessible.	Retain current level of accessibility.
- WWII anti-submarine features	Generally accessible.	Retain current level of accessibility.
GAP BLUFF	Unrestricted Access currently available for visitation to the Gap area. Formed paths stop short of the site but the area is regularly and heavily visited particularly by tourists.	Retain current level of accessibility. Improve access around the fortification to improve safety by clearing undergrowth and providing clear access routes.

Location	Current Status	Proposed Access Arrangements
- 1912 gunnery training wall	Unrestricted Access	Retain current level of accessibility.
GEORGES HEAD	Access has been available in the past to underground facilities, but condition of the structures and staffing shortages have closed most regular access. Presently access is not co-ordinated and there is no signage to indicate availability or restrictions on access.	Reinstate access to major underground facilities as key part of Harbour fortifications through managed and organised tours, potential open days and other controlled access. Link access to Middle Head and Obelisk Point sites.
- 1871 beehive casemate group	Managed access to interior, not visible externally. Currently not accessible to public due to required works.	Provide higher levels of public access through managed tours and potentially at open times with staff presence.
- 1886 armoured casemate group	Managed access to interior, visible and accessible externally. Currently not accessible to public due to required works.	Provide higher levels of public access through managed tours and potentially at other times with staff presence. Attention to site safety may be required.
- 1942 WWII searchlight, lookout posts and gun positions	Above ground areas accessible. Below ground areas not accessible.	Retain current level of accessibility.
INNER MIDDLE HEAD	Access to the area is low key with a formed (early former roadway) walking track to the escarpment edge from the main building complex. This provides access over a former gun emplacement and to two WWII cliff top installations that provide good views. Informal tracks extend over the fortifications leading to the remaining open gun emplacement, this connects to a bush track that extends to the Outer fortifications. Access is random through the core site but defined	Access to and through the area is highly desirable but needs to be better defined, more easily accessible, signed and intentional. 1 Establish a main path or route that connects the entry buildings of NPWS to the fortifications intended for visitation through to the Outer Fortifications. Make it accessible for a range of visitor types. 2 Establish minor access routes to other features designated for visitation. 3 Block other access tracks and paths as required, do not provide access to
	from each end which makes the site confusing to visitors who are not familiar with the area. Other lesser unformed tracks extend to the retaining wall and ditch and other features. Below ground access is available to the range finding station and to the major battery (through collapse of earthworks), this is undesirable and dangerous. The access apart from the two tracks is not appropriate, is causing deterioration of the historic elements and presents a range of OH+S issues.	remote locations. 4 Remove fill from main entry to underground battery area and reactivate main gate. 5 Stabilise collapsed fill to gun emplacement and block access to battery at that point. 6 Provide signs that interpret the area and provide direction for visitors. 7 Keep access low-key, informal but safe and retain the abandoned character of the area. 8 Develop detailed strategy to open underground areas for more general public access potentially through organised tours.

Location	Current Status	Proposed Access Arrangements
- 1871-1889 battery remains	Most of the1871 remains are below ground with portals infilled but retaining some access for the intrepid, they are not generally accessible except through a collapsed area in one f the emplacements. The 1889 remains are partially accessible with one gun position open and linked to a walking track. Underground areas and vents are secured.	Provide more complying access to the remaining emplacement, link to main path. Excavate main access ramp and reactivate. Look at opening underground areas for public access.
- 1889-1918 range finding station	This is an underground installation that is not secured and is available for public access. It is accessible from the walking track to the Outer fortifications but is not signed or marked. It is not lit. Access if via a steep stair with railings.	Retain as open facility and provide cleaning and management to ensure it is safe.
- 1940-1945 guns and observation posts	Several positions are accessible within the bushland near the walking track. They do not appear to be accessed, they are in poor condition with some collapse and are not safe.	These sites should remain as ruins and not be generally accessible but will remain seen from the pathway. External access is appropriate. Cliff top stations that are currently accessible should remain with good public access.
- 1871 outer defensive ditch	Access not available. Ditch partially infilled at main entry area.	In short term retain in current form. Long term excavate ditch for full extent and reinstate as separating ditch to headland for interpretation.
- inner defensive ditch	Retain as ditch where it remains.	Clear from vegetation and provide limited access.
OUTER MIDDLE HEAD - 1871-1882 battery remains - 1882-1892 modifications - 1892-1911 emplacements - 1912-1945 battery - post 1945 elements	Outer Middle Head is an extensive site that has open access to many areas both above and below ground. It is the most managed of the immediate sites and has high levels of visitation. Tours sometimes take place into below ground areas but most are closed to general access. Many are interconnected which provides high potential for tourism. The above ground areas and the extent of elements remaining is extensive and access is relatively easy. A large number of safety fences are erected to provide for the types and level of visitation. Some areas are barricaded either permanently or temporarily as they are dangerous. The general approach to the area (past the NPWS offices) is to limit on site parking and rely on remote parking and access by foot onto the site.	A high level of access is desirable both unmanaged and managed. It should: 1 Provide a clear access strategy for the whole site linked to types of visitation, availability of parking, consideration of disabled and elderly visitors, etc. 2 Tours of the whole area should be developed to provide higher levels of access to secured areas of the site. These could be developed around themes and degrees of difficult of access. 3 Access should be linked to the whole of the Middle head area including Inner fortifications, Obelisk Point, and Georges Head. This will require a broad access strategy and management plan. 4 Provide interpretation as part of access. 5 Create a safe, child and elderly friendly access route around the site. 6 Upgrade barriers to a consistent and sympathetic form over time to provide less visual intrusion into the area.

Location	Current Status	Proposed Access Arrangements
	Currently there is poorly defined parking and difficult general access although this could easily be remedied with an access management plan and strategy. This would limit the visitation to the site as it largely relies on remote parking and walking. Organised tour access is accommodated. The site links to Inner Middle Head but is not adequately signed so that the casual visitor is unlikely to find other parts of the site. The whole site lacks logic in terms of access although exploring the site in a random way adds a level of interest.	
NORTH HEAD	Access is generally available to parts of Blue Fish and selected other sites. A number of sites do not have potential for access. Blue Fish access if from the walking track that extends to the beach areas below. Visitation is from bushwalkers and specific visitors to the fortifications. Major visitation is to the nearby North Fort which is a major installation with interpretation.	Retain the current levels of access in the short-term future. Consider restricting access to sites as they deteriorate. Do not provide additional site access.
- 1941 Blue Fish radar	Three of five sites have organised access, two sites are ruinous and in heavy undergrowth.	Do not provide access to ruins. Review access to other sites based on condition and safety assessments.
- Headland lookouts	Access is provided to one lookout, secure fencing prevents general access. Cliff face areas are not accessible.	Retain current access arrangements.
OBELISK POINT	Access to this spread group of sites is random, unplanned but frequently used by a range of visitors including fishermen and people accessing the cliffs and beach below. It is difficult to locate the sites for the casual visitor as there are no formed tracks. The sties are very difficult to access when discovered due to overgrowth and deterioration of fabric.	Organised access on safe tracks is required to the sites identified in this study to retain public access and minor sites should be closed off from access. Access should be integrated with walking tracks that access Inner and Outer Middle head and Georges Head. Access needs to be integrated with clearing of accessible sites to allow safe access.
	Rough tracks extend across the area, there is no formed and safe access to any site.	
- 1801 battery	No formal access, a series of poorly formed tracks cross the area. Access to the fort is blocked by undergrowth.	Provide a formal tracks access to the fortification as part of a broader strategy for access.

Location	Current Status	Proposed Access Arrangements
- 1889 submarine miners observation post	No formal access, a series of poorly formed tracks cross the area. Internal access is blocked by undergrowth.	Close of future access to the location and allow to revegetate.
- 1892 Nordenfeldt gun site	No formal access, a series of poorly formed tracks cross the area. Internal access is blocked by undergrowth.	Close of future access to the location and allow to revegetate.
- WWII Case battery features	No formal access, a series of poorly formed tracks cross the area. Internal access is blocked by undergrowth.	Provide a formal tracks access to the fortification as part of a broader strategy for access.
SOUTH HEAD	Access is available to many of the above ground sites within the headland park area with formed access paths (that provide safe access around most of the headland area) and open areas of grassland but not formally to structures on the cliff face or along sections of the cliff top below the boardwalk and access path areas. Unformed tracks provide access to some remote areas. Access is occasionally provided to sections of the below ground areas for special occasions but not generally available. The site has high visitation and key elements are frequently visited	Retain access to major fortifications in park area. Restrict access to cliff edge and face elements as required. Secure areas to prevent access to dangerous access areas. Continue to provide occasional access to safe below ground areas for the public through organised access tours. Do not access unsafe below ground areas until stabilised.
- 1871 battery and engine house and associated elements along the cliff top and edge	Cliff top structures have free public access. Below ground areas are secured with occasional access to main battery. The engine room has ladder only access at this time and is not suitable for general access.	Retain above ground unrestricted access. Provide for occasional below ground access via guided tours, limit access probably to key event times in the location. Consider linking the engine room with underground access via a secured doorway to provide safe access, do not allow general access until an interpretation plan is in place to guide future action.
- WWI and WWII cliff edge structures	Several sites on the cliff edge are accessible and safe for general public access, elements below the cliff edge are not safe for general access and are currently accessed from climbing or steep informal tracks.	Apart from safe access sites above cliff line, restrict all access to cliff sites, provide barriers, fencing etc where necessary to indicate access is not available.
- former pathway and structures along cliff edge inner harbour	A boardwalk defines public access but is breached at several locations by worn tracks to access cliff top remains of lookouts and searchlight positions. The remains of a former boardwalk extend around part of the harbour edge below road level but accessible and dangerous.	Consider providing limited access through a formed track to the main access point from the boardwalk, the cliff top structures would need to be cleared and made safe. Restrict all other cliff top access by fencing or revegetation. Prevent access to the boardwalk and remove dangerous sections to prevent injury.

Location	Current Status	Proposed Access Arrangements
- sandstone drainage moat and rifle post wall	Access to the area si through this installation with good access tracks and safe and easy access to fortifications.	Maintain current access arrangements.
STEELE POINT	The section of site within the National Park is generally accessible apart from a small underground section. It forms part of the broader park area of Nielsen Park and is a vantage point to look out across the harbour.	Maintain the current access arrangements.
- 1871 and later fortifications	As above.	As above.

OH+S Issues

All of the sites have potential issues related to OH+S due to their locations, their form, their ruinous state and their deteriorating condition. A common sense approach must be adopted in regard to assessing risk as outlined earlier in the report. This section looks specifically at risks to staff and visitors where access is provided and there are issues that could reasonably be addressed to prevent risk. It is not a comprehensive audit or review but an overview of key areas.

The major issues are:

- ensuring that sites can be accessed with reasonable safety whether for public or staff only access (also addressed in sections above)
- ensuring that structures are secure and safe from collapse where accessible
- identifying risks by observation of visitor practices and behaviour to avoid obvious risks
- ensuring that good management practices are in place to minimise risks and to remedy risks quickly when they are identified.
- ensuring that security of non-accessible areas is maintained.
- ensuring that staff observe safe working practices commensurate with the ruined state of the sites.
- ensuring that underground access is free of major risks when accessible to the public commensurate with entering abandoned areas and that visitors are made aware of the care needed in each situation.

Matters such as drop-offs at cliff or building edges and into fortifications are not considered to be an OH+S issue as they are intrinsically part of the sites, they are considered elsewhere in the study. The current situation where areas of high tourist visitation have protection where there has been a risk assessment is a sound way to address site safety and OH+S issues. Signage warning of general hazards at all sites would be advisable.

Table vii OH+S Issues

Location	OH+S issues (if any)	Recommendations
BARE ISLAND	Generally the site is well-managed and has few issues. Access is not always protected and general care is needed moving around the site.	Develop specific responses as part of future use plans for the site.
BRADLEY'S HEAD	Generally the site is well-managed and has few issues. Access is not always protected and general care is needed moving around the site. Access to the foreshore around the 1850s fort requires attention to safety.	Provide fencing to used poor access areas.
CAPE BANKS	The major issues for OH+S are illegal access and the dangerous state of the remains. This is seen in severely rusted doors, rubbish build up in the structures and lack of security. After sealing up there should be no below ground access available for any purpose.	1 Remove rubbish from site. 2 Remove steel doors and projecting steel items capable of causing serious harm to visitors. 3 Secure below ground areas, this may require backfilling some areas to physically prevent future access. It may also require filling in of some vent shafts. This is a potentially high risk site that cannot be effectively managed.

Location	OH+S issues (if any)	Recommendations
HENRY HEAD	The site has low access and risks are considered generally acceptable. Areas of OH+S risk are - potential collapse of later structures - projecting steel doors that are severely rusted - undergrowth making access difficult with fall risks. Below ground access is generally safe for staff and presents no perceived hazards.	1 Prop or demolish structures as discussed elsewhere prior to collapse 2 Clear vegetation from access points to allow safe access to open structures 3 Remove dangerous steel elements from the site and generally clean up.
GREEN POINT	Generally the site presents no hazards to visitors. Clearing of undergrowth would assist removing potential hazards from remains. Staff access to the underground area is poor and should be relocated with an entry door to the 1871 portal. The underground area should only be accessible to staff for monitoring.	1 Remove undergrowth. 2 Consider a new access door. Do not regularly access the underground area without improved access.
GAP BLUFF	There are no OH+S hazards that were apparent during inspection noting that access is not formed and tracks are informal.	1 Maintain the area in a clearer form with better general access around the ruins.
GEORGES HEAD	The sites are generally free from obvious hazards. Minor works are needed to each element such as repair of steps to Beehive casemate and securing of plasterwork and timberwork in armoured casemate to allow future access. The armoured casemate has some protection to drop-offs with fencing but not in all locations. Where fencing is not complete it would be desirable to complete it to properly protect the element. Ensure that visitor access is safe and that visitors are equipped with torches etc as lighting is not available.	1 Undertake minor repairs to steps and timberwork to allow public access. 2 Extend fencing to high drop-off areas where fencing is already in place. 3 Establish safe access practices for visitation.
INNER MIDDLE HEAD	Inner Middle Head has lower visitation that the adjacent outer site. Access is poor and even formed paths are not complete with hazards. Access to the ruins is also poor. The site requires a network of access that is planned and relatively risk free, the casual track form currently used is appropriate provided it interconnects. Other hazards that need to be rectified are the open access to below ground areas through the landslip, access to the collapsing retaining wall and signs.	1 Provide an enhanced path network to connect back to Outer Middle Head without obstacles. 2 Close off below ground access and fill area or stabilise to prevent risk of accidental falling. 3 Provide signs 4 Block informal paths to cliff edge and retaining wall. 5 Redirect visitors and revegetate areas as currently taking place. 6 Secure shafts.
OUTER MIDDLE HEAD	This is one of the highest visitation sites and in recognition that many visitors are not familiar with ruins extensive fencing and barriers have been provided at areas assessed to have unreasonable or difficult to ascertain risk for visitors.	1 Maintain the current fencing and develop a standard approach to the provision of barriers. 2 Prepare a detailed site OH+S assessment using the principles in this plan to guide future works and access.

Location	OH+S issues (if any)	Recommendations
	This is a sound approach that although a little visually intrusive provides a relatively well protected environment. It is not however comprehensive and it does not purport to satisfy compliance codes for safety. It is only an indicator of risk. This needs to be set out in signs. There are minor issues of access and safety that are beyond this study to address however more detailed site planning should provide a safe access route through the site for those with disabilities, the young and the elderly.	3 Provide signs to advise of risks. 4 Develop a safe access route through the site for major visitation.
NORTH HEAD	The only perceived risk is that of potential collapse of the ruins due to visitation.	1 Monitor status of structures and close if considered dangerous.
OBELISK POINT	Currently the OH+S risks are complex as the sites are not formally accessible but are easily accessible with unsafe access paths that place visitors close to cliff edges and which can lead to visitors getting lost and possibly reaching cliff edges by accident. The sites are also unsafe with extensive overgrowth and no clear access points. Rubbish is located in several locations that is potentially dangerous. Retain below ground areas in a secured condition.	1 Establish clear and formed access paths to areas to be accessed. 2 Close other paths 3 Clear undergrowth to allow safe access to areas that will be visited irrespective of barriers (such as 1801 fort). 4 Remove rubbish and fallen material from sites. 5 Maintain security to structures.
SOUTH HEAD	The OH+S issues are found in the cliff edge structures that are not intended to be accessed but which are readily accessible. The fortifications generally are secure with good access and security. No further security or safety measures are generally required except for the cliff edge location near Hornby lighthouse which is accessed by visitors who climb on the walls which are close to the cliff edge and present a high risk. The engine room access through a coal shaft is not ideal and should in time be replaced by an internal door to the remainder of he underground battery.	1 Prevent access to cliff faces by selected barriers at key points and signage. 2 Provide a safety barrier (low key) below the lookout location in case of falls. 3 Provide an access door to the engine room prior to future access. 4 Remove dangerous boardwalk elements on cliff edge path. 5 Either block or create formal paths to harbour structures from existing boardwalk to prevent unwanted access.
STEELE POINT	There are few OH+S issues. Cleaning up of the underground entry portal area from building materials would reduce a low risk.	None

Recommendations

1 *Maintain an OH+S report on all sites identifying risk and issues that arise or are observed and implement a system of resolving issues with an annual review.*

2 *Do not access areas considered to have risks until they are resolved.*

3 *As has been the case in the past, provide temporary barriers at high risk areas until more permanent solutions can be implemented.*

4 *Develop a consistent sign policy at all fortification sites advising that the sites have intrinsic risks that require care and caution from visitors. Seek advice on wording of signs.*

5 *Establish priorities for managing OH+S matters so that high risk areas are resolved quickly.*

Ability to be managed

The fortification sites occupy ten separate locations around Sydney two of which currently have a NPWS staff presence in the general vicinity. None of the sites have NPWS staff at the location of the fortifications although Bare Island, due to its form and the fortifications, is not accessible to the public. Four of the sites are remote and abandoned with only irregular staff visitation. Apart from Bare Island all sites can be accessed after hours even though access gates to the general location may be locked and visitation discouraged.

The sites also fall into two regions, north and south of the harbour, with related but separate management responsibility.

Management of the sites is undertaken by the ranger responsible for the area in which they are located with input from the conservation section of NPWS and very valuable input from several staff who have a particular and detailed knowledge of the fortifications. The role of informed and interested staff members cannot be underestimated and is potentially one of the best resources available to future management.

However individual staff members cannot be relied on into the future for management as there is a significant change of staff in the Service and no guarantee that staff with these accumulated skills will remain. There is also no single person responsible for the overall management of the fortification sites so that there is limited co-ordination in approach.

The outcome of this is that the overall management of the fortifications is difficult. The focus of management in the future should be as set out below.

Recommendations:

1 *Maintain security of sites, particularly where there are sub-terranian structures or potential OH+S issues. If necessary increase the level of security to prevent unwanted access.*

2 *Provide clear standards on OH+S and safety issues and provide risk assessments and audits for all sites with recognised access*

3 *Establish a monitoring system as outlined above.*

4 *Minimise the management tasks of remote and abandoned sites with a number of strategies including:*

- *where possible closing the site to public access*
- *improving and upgrading security*
- *making particular sites difficult to access by closure of tracks and roads and by regrowth around the sites*
- *restricting activity such as interpretation and tours to a small number of sites that can be effectively managed*
- *providing clear guidelines for rangers with management responsibility for low access or remote sites.*

Potential for Interpretation

Interpretation is the key activity required across the portfolio of sites that make up the fortifications of Sydney. While NPWS manage most of the fortifications, there are other stakeholders such as Sydney Harbour Trust and Defence who manage sites such as North Fort, Georges Heights and sections of other sites including Steel Point, Gap Bluff and South Head. It would be highly desirable to jointly undertake interpretation and not to duplicate or attempt to interpret elements that are already successfully interpreted elsewhere.

It is also clear from this study that while it would ideal to interpret all sites that this is not practically possible, financially viable or desirable. In fact the combination of interpretation and the required works to allow that interpretation to take place is so great that it will not take place.

The key strategy recommended in this report is to focus interpretation and then conservation works and upgrade works at two sites and to plan a major program to elevate those sites to State and National tourism significance as icon sites within the NPWS portfolio. These sites are the combined Middle Head/Georges Head/Obelisk Point site and Bare Island.

It is recommended that they have different approaches to their interpretation with the Middle Head site being the focus of a significant funding approach to government

Interpretation is required however across most of the sites as there is little that is revealed from visiting sites except the general understanding that they are fortifications.

The basic approach to interpretation should be:

1 All sites identified for interpretation should have some basic interpretation available on site that is easily found, is secure and vandal resistant. A simple panel of information is basic and effective for most sites and is likely to be the most cost effective system.

2 Each interpretation panel should contain information about
   - the history of the site including ordnance
   - its role within the overall fortifications of Sydney
   - a general small map locating other fortification sites
   - a site plan where appropriate showing how all the site elements worked and what the various remains are
   - a link to a NPWS fortifications website (yet to be developed)
   - contact for tours if applicable
   - some information about other values on the site

3 Develop a small publication of fortifications for sale that can be used as a guide to all the fortifications of Sydney, it could be available from NPWS offices or other local shops.

4 Develop a ‘DL’ format walking guide to key sites about fortifications.

5 Establish a website for fortifications, probably in conjunction with other groups such as North Fort with additional information

6 Develop themes to be interpreted across the sites. It may be desirable to develop different themes at different sites so that there is something new at every site visited. This may encourage visitors to explore more than one site. The themes will be broad and should include:
   - identifying and discussing the threats that brought about the fortifications
   - the key periods of fort building and their differences

- ordnance and changes in weaponry that changed the fortifications
- government and military policy in approaches to fortifying particularly in relation to the relationship of the colonies to Britain and the provision of troops and defence
- did the fortifications work? did they actually ever get activated?
- specific stories such as the mini submarine attack which is one of the very few instances of combat
- ruins and how they are conserved

7 Use the various methods to engender an ability in visitors to discover for themselves elements of interest.

Table viii Interpretation Potential

Location	Potential
BARE ISLAND	**High** As an enclosed and island site it has potential to develop interpretation that is secure and can be more adventurous. There is potential to have interactive interpretation, provide adventure programs for children, include commercial activities on the site, run a programmed site, use minimal signage but develop published material, use self-discovery programs.
BRADLEY'S HEAD	**High** Due to its location and high visitation the site is easily managed and can provide good general interpretation. This would be limited to information panels. Having two periods of forts provides good opportunity. Ideally interpretation at the waterfront would guide visitors to the upper fortifications which are the most interesting but which get less visitation.
CAPE BANKS	**Low** This site is not recommended for site interpretation but should be included in published material but noted as not accessible.
HENRY HEAD	**Medium** Henry Head due to its location requires only basic interpretation that could be a fixed panel. **Low** As access is a bush track other aspects of the area could also be interpreted.
GREEN POINT	**Medium** A simple panel would provide adequate information particularly related to the submarine net with history of the other aspects of the site. The below ground areas need to be treated carefully to minimise risk of break-in.
GAP BLUFF	**Medium** A simple panel that links the site to other fortifications in the area and provides a brief site history and explanation of remains.
GEORGES HEAD	**High** This site contains two of the most impressive fortifications on the Harbour and has extensive potential for interpretation through visitation, tours both general and thematic, interactive events, etc. The site should be closely linked to the Middle Head sites for interpretation. Interpretation should link the WWII sites to related sites on the south side of the harbour. A general explanatory panel should be provided for causal visitation but the interpretation needs to be developed as part of a researched interpretation plan for the area.

Location	Potential
INNER MIDDLE HEAD **OUTER MIDDLE HEAD** **OBELISK POINT**	**High** These sites have very high potential for interpretation as they cover the broadest range of construction and use, from 1801 to the 1970 period and contain elements from every stage of fort construction. The sites also contain some of the most interesting and unique structures. There are significant below ground elements that are safely and easily accessible and all of the sites can be linked for organised interpretation. This group of sites have interpretation potential for: - Self-guided tours or the opportunity for visitors to generally explore with some direction from either signs or printed brochures. These could be unplanned, based on themes, etc. - Guided tours with a range of options such as thematic, aimed at interest groups, aimed at age groups, aimed at specific visitor types such as overseas tourists, etc. - International tourism - Provision of other site activities related to National Parks such as flora and fauna tours - Provision for other services including displays, sales and marketing. - Events and special programs - Educational programs for schools and other related groups - Development of conservation techniques and programs - Archaeological programs
NORTH HEAD	**Medium** This is an historically significant but relatively minor group of features. A simple panel that links the site to other fortifications in the area and provides a brief site history and explanation of remains would be adequate at the Blue Fish site as long as it is accessible. Interpretation in terms of priorities is low at this site.
SOUTH HEAD	**High** This is an extensive site with high visitation, an interpretation strategy could be to provide several larger overview panels of the history of the headland and then to provide smaller more discrete panels at the key sites such as the 1870s battery, the gunnery wall, the WWII remains adjacent to the lighthouse and the uncompleted stone fort, all expanding the more general information. In time if the area is further developed with underground access this could be subject to more site specific interpretation.
STEELE POINT	**Medium** A simple panel that links the site to other fortifications in the area and provides a brief site history and explanation of remains.

Implications for funding

The cost of management, maintenance and conservation work to the fortification sites apart from upgrading for visitation and access, is substantial. It is a large, diverse and difficult portfolio of properties that could absorb almost endless time and money. The current funding and management is inadequate to address even basic issues, however, through the interest of staff and specific works programs, the sites are managed and conserved at least to some level.

This strategic plan looks to make significant changes in both management and funding for these sites. It is not possible to manage sites of national value without major funding programs being put in place. If funding is not made available (and from that staffing and management), the sites will fail at an accelerating rate and there will be substantial loss of structures, features and values.

To date the rate of failure of sites has been manageable as core structural and material failures have not been obvious or have not reached a stage of needing intervention. This study concludes that there are significant structural and materials conservation issues arising across most of the sites that will require major works and interventions to make the sites safe and accessible. It is not possible to fund this scale of work from regular NPWS funding sources.

In addition to this there are sites of such high heritage value that they demand a program of access, interpretation, visitation and tourism that will require significant funding to establish.

A key conclusion from this study is that in particular the Middle Head group of sites is of such outstanding heritage value and potential that they must not only be conserved but require a major program of interpretation and tourism with the potential of becoming one of the 'must visit' sites on the Harbour. Bare Island has similar value to the Botany Bay region.

A major attraction of the core sites is their ability to bring together the range of values that comprise the Sydney Harbour National Park including built and natural and to tell a story about Sydney that is dramatic, exciting and interesting with spectacular views and setting. Middle Head is perhaps the most outstanding location in the Harbour to appreciate the values of the harbour setting with its views to North and South Heads, to the north and back down the harbour to the eastern suburbs.

An important basis for looking at funding is to consider the sites as a group, irrespective of their location, and to manage them as a single entity.

The funding strategy is in three parts:

1 Major Works funding

The extent of cost of major works is not identified in this plan. This will need to be carefully developed and costed with advice on operational issues, tourism, market appeal, landscape and other works, conservation works, additional facilities and infrastructure etc. The extent of cost is however considerable and will require specific funding probably directly from government. To prepare the site for a substantial program will be in the order of millions of dollars.

It is envisaged that a staged program would be developed with funding being made available over a period of 3 to 5 years, and an initial period of at least a year for planning.

A project plan will need to be developed with costings and market research to present a compelling proposal for funding allocation.

The program to proceed on this work would be:

1 Engage tourism and marketing and heritage advice (may need other input)
2 Scope conservation works in detail
3 Develop interpretation strategies and themes
4 Develop an operational and access model around a detailed brief and interpretation plan
5 Scope upgrade and infrastructure works
6 Prepare overall strategy for approval
7 Prepare funding submission.

This funding will need to be sourced from government as a special funding application.

2 Conservation Works funding

For sites other than the core sites the conservation works need to be scoped in some detail and set out within a time frame. Costings need to be developed and priorities applied over a long-term program. Priorities should be based on those in this report but may need to be adjusted on closer analysis.

This process will allow an annual funding program to be developed that can be either site based or based on areas of work such as stabilising steelwork where a number of sites could be worked under one contract. Using a broader approach should allow some benefits of scale to achieve cost control and will allow close monitoring of results.

It is estimated that works would not take place in year 1 as this will largely involve planning and programming but a works program over the next five years would start with an annual expenditure of around one million dollars. This would need to be specially funded. Project management and supervision will need to be factored into costings as this will be outside the ability of NPWS staff to undertake in terms of time and in some areas experience.

3 Ongoing management and maintenance funding

This is the minor works end and comprises the day to day management of sites. The recommendation of this report is that much if not all of this work can be undertaken by NPWS staff with limited additional cost. It may be necessary to establish systems and programs to allow an organised approach to take place.

Additional staff time will be needed to attend to all of the activities set out in this report. This may require additional staff and cost.

The time requirement of inspection, monitoring and undertaking clearing and minor works needs to be assessed and an annual budget allowed.

This funding would come from current funding sources and programs available through the NPWS funding system.

Site Plans and Bibliography

Mapping of the sites is varied and random. Some sites have excellent mapping, others have none. Most accessible mapping has been in copies of reports where the quality of copies is poor. The following figures provide the mapping that has been gathered for as many sites as possible. It is linked with the list of reports and documents that have been provided, researched and used related to each site. The holding location of reports is not known as most were provided as part of the project brief and appear to have come from a range of sources. The bibliography only lists reports and books, articles are not noted. There will be other material that has not been sourced or provided and over time the bibliography should be extended.

Also provided are lists of site feature identification where these are set out.

Sydney Harbour Fortifications – General Reports and Publications

Sydney Harbour Fortifications, Archival Study
Roy Harvey
Final Report, Part 2
4 January 1985
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G.C. Wilson
Part One, March 1985
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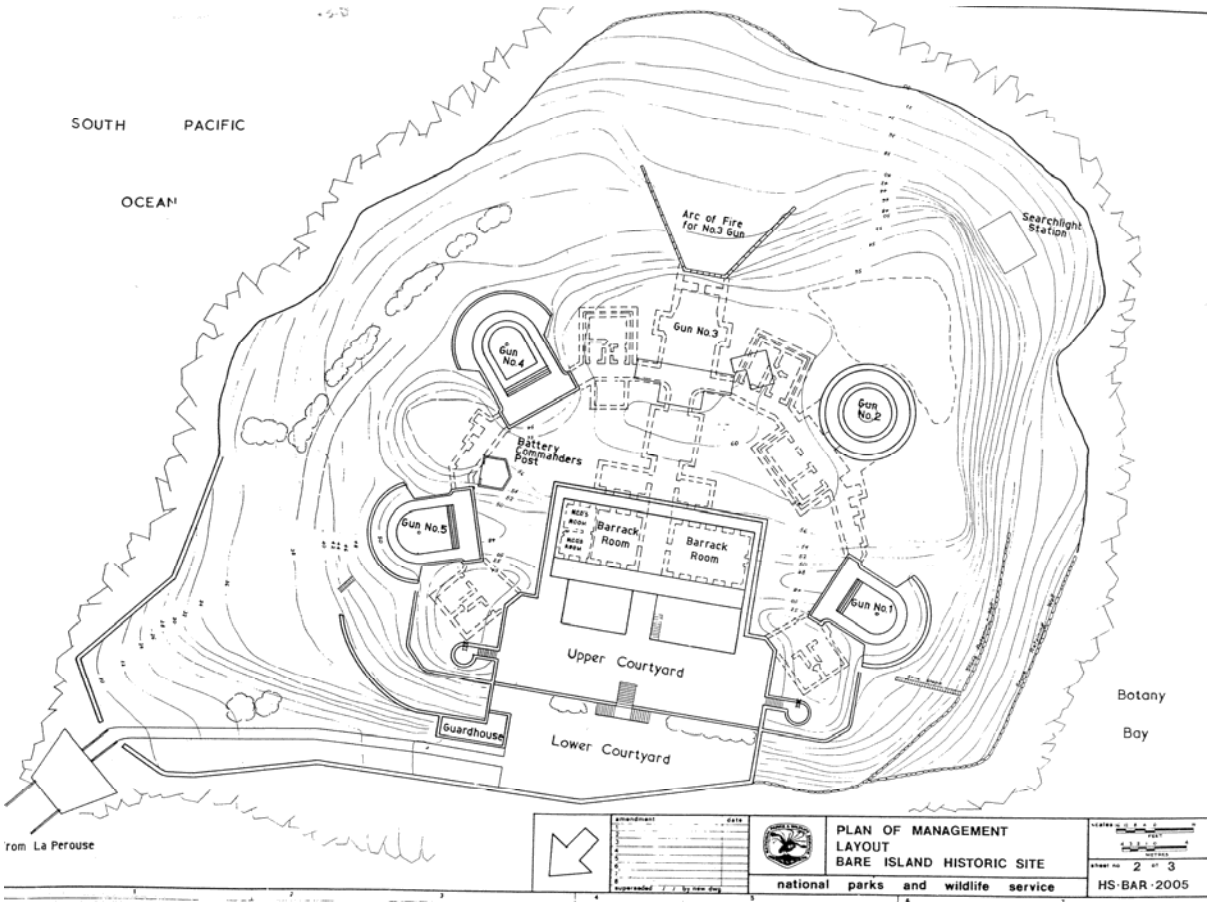
June 1985
Prepared for New South Wales National Parks and Wildlife Service

The Fragile Forts
Peter Oppenheim
2005

Bare Island



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National Parks and Wildlife Service of New South Wales
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Bare Island, Conservation Plan, Volumes 1 and 2
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Prepared for NPWS Sydney District

Bare Island, La Perouse, Report on Materials and Structural Investigation
McBean & Crisp Pty Ltd
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Bare Island, La Perouse, Report on Structural Condition and Cultural Significance
McBean & Crisp Pty Ltd
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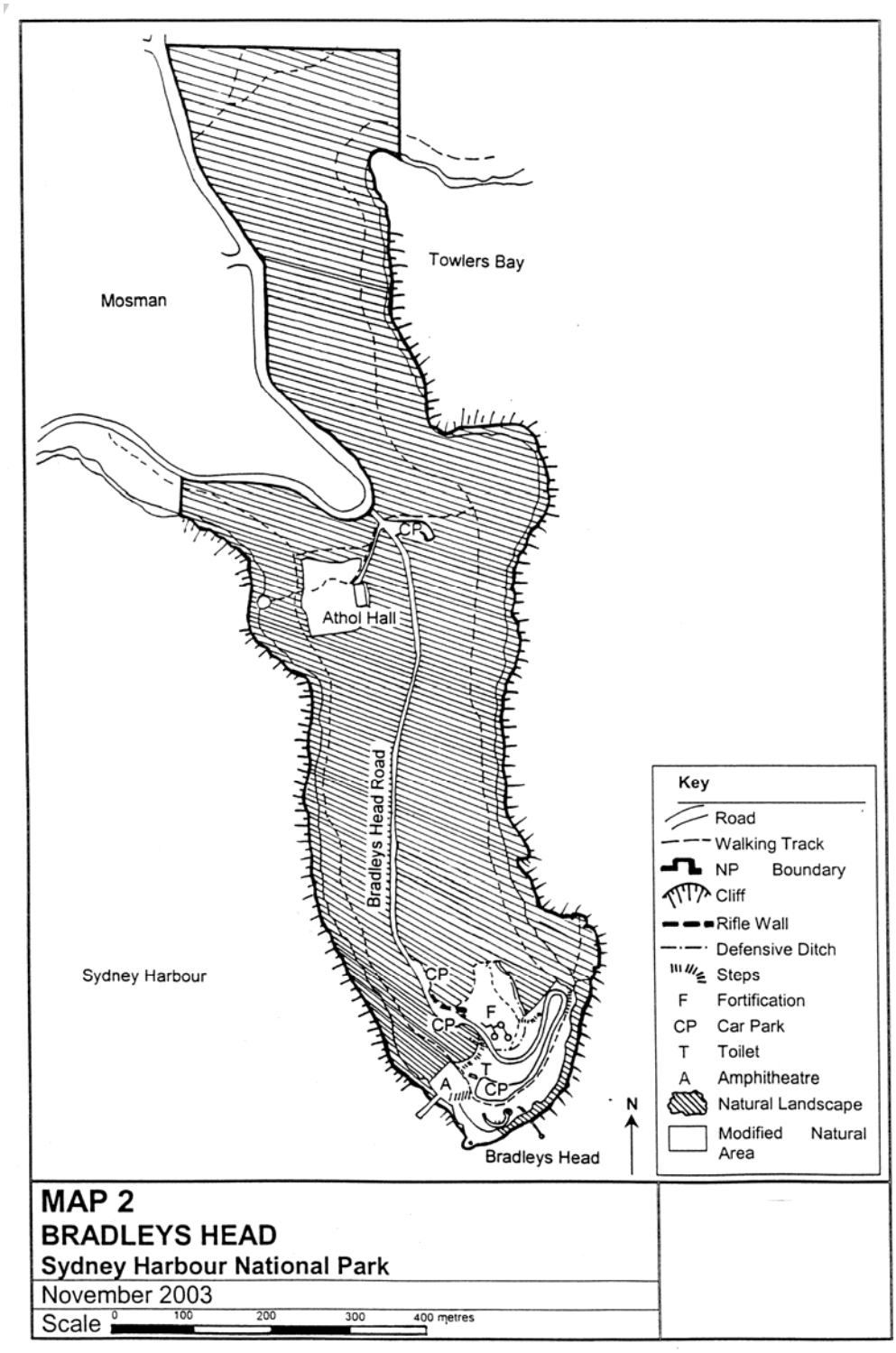

Site Plan of Bradley's Head. NPWS Sydney Harbour National Park Plan of Management 2003

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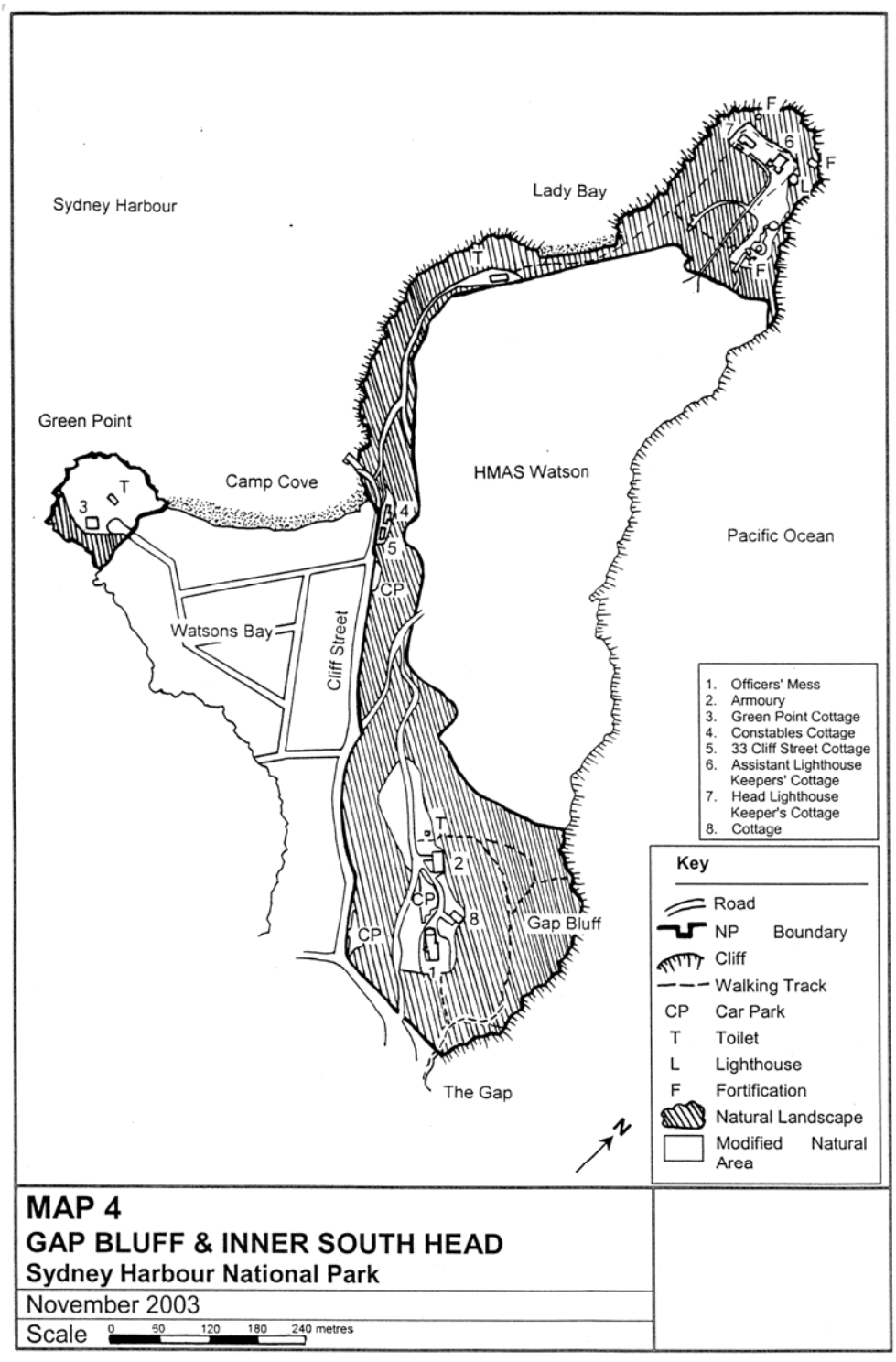

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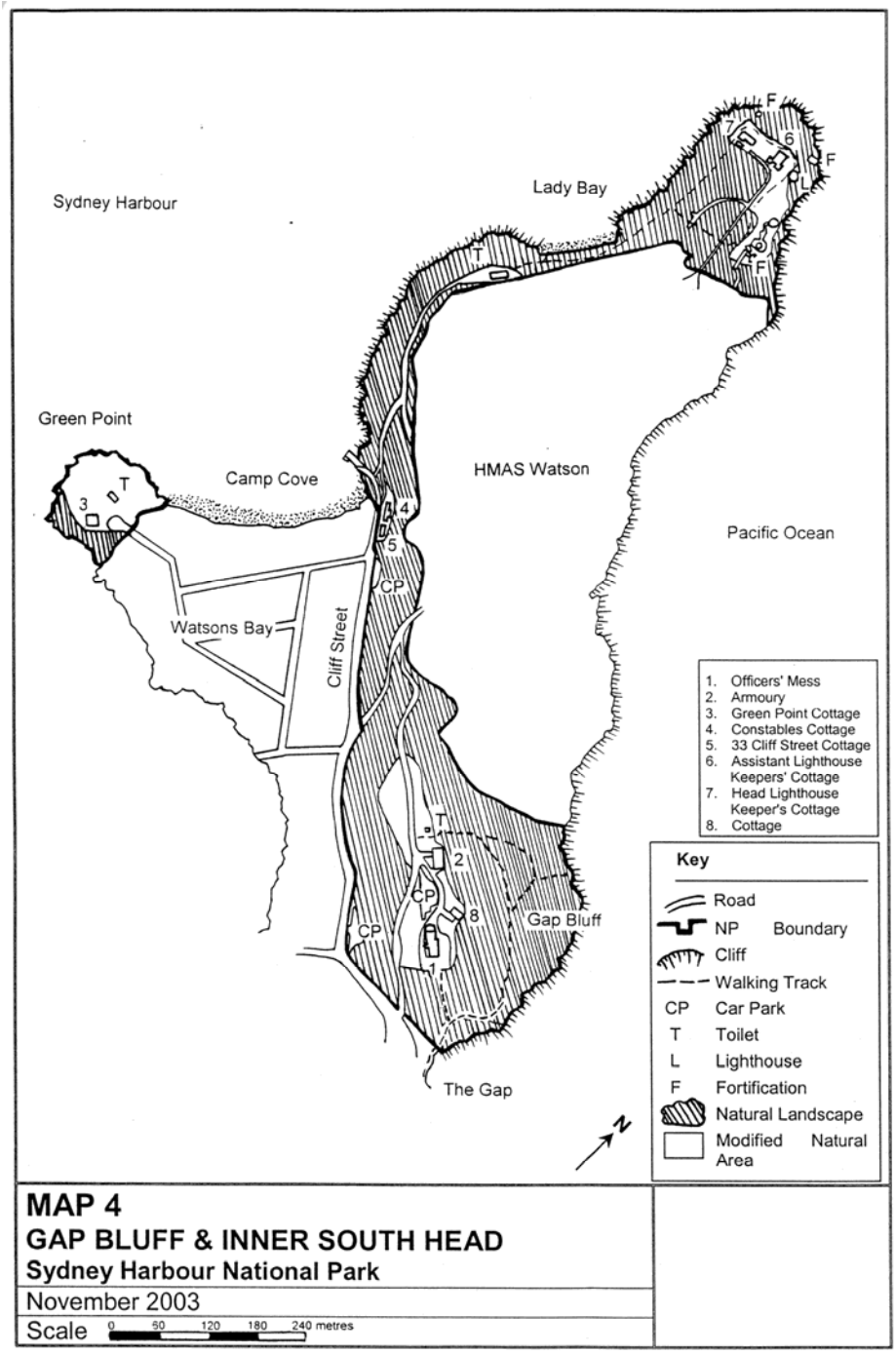
Gap Bluff



Site plan of Gap Bluff. Sydney Harbour National Park Plan of Management 2003

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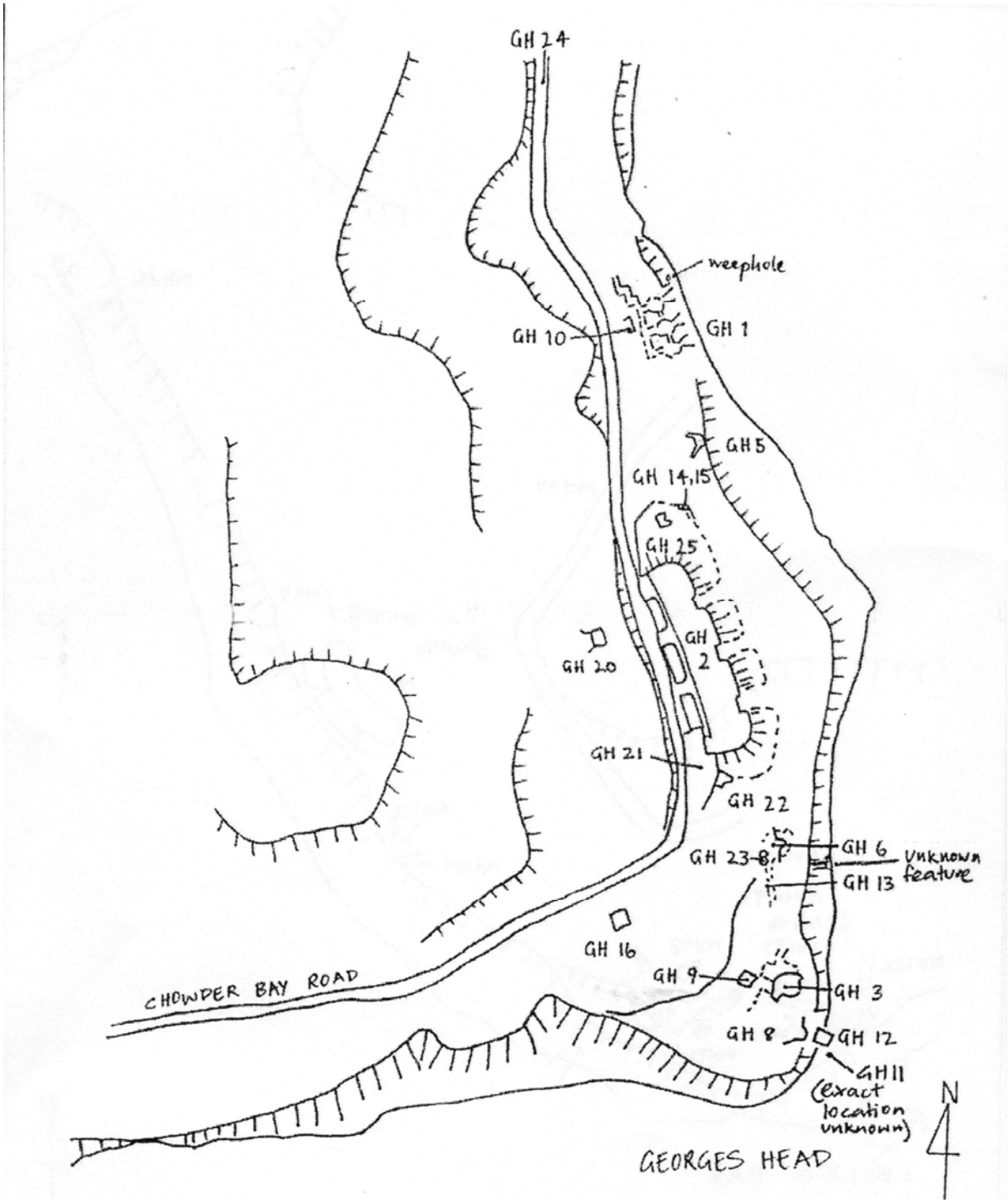

Georges Head Site Plan – Gojak. Key Features are:

GH1 Beehive Casemate

GH2 Armoured Casemate

GH3 Case Battery

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The Beehive Study
J.L. Heineman
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Denis Gojak
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Melinda Dockrill (student)
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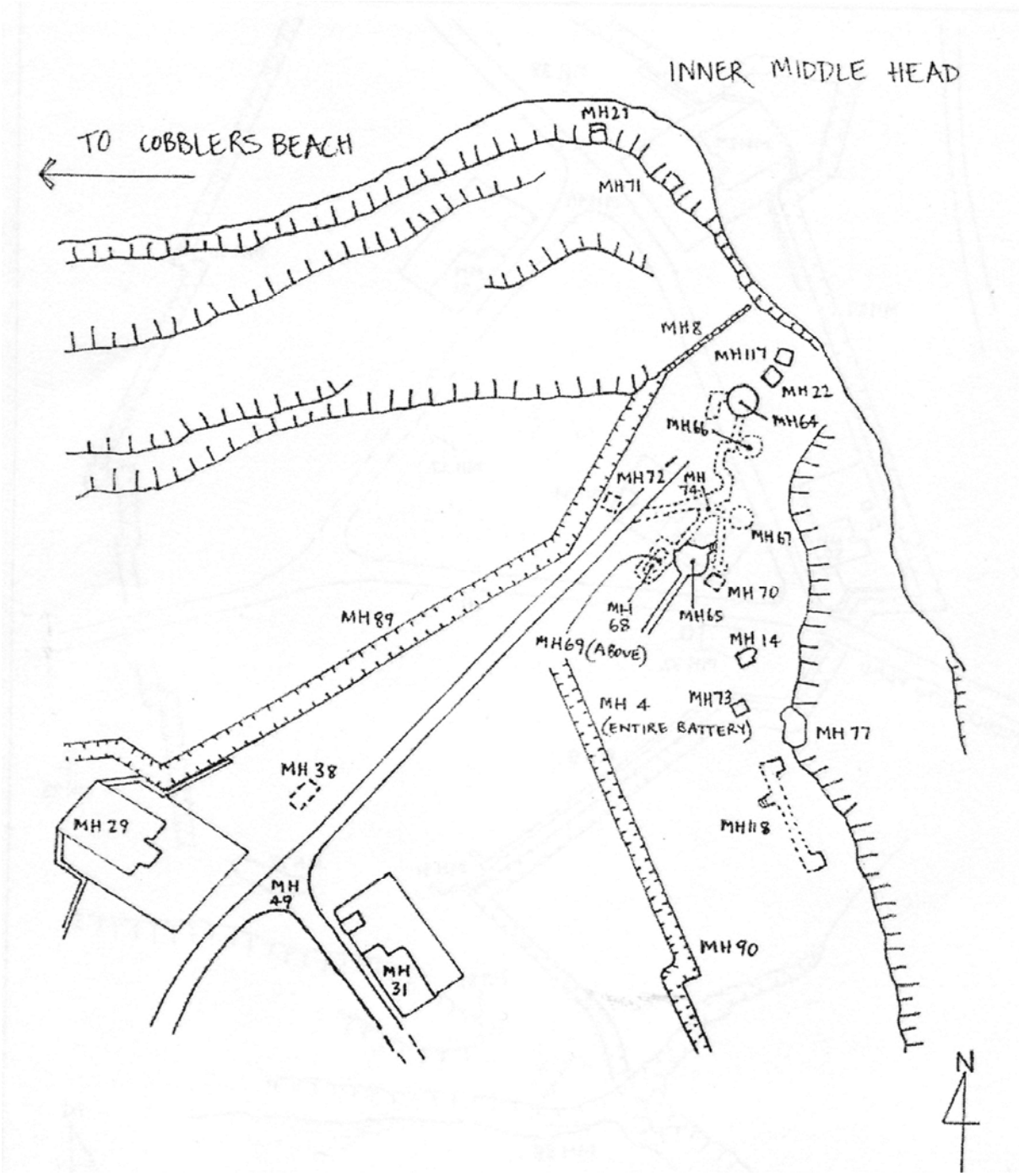
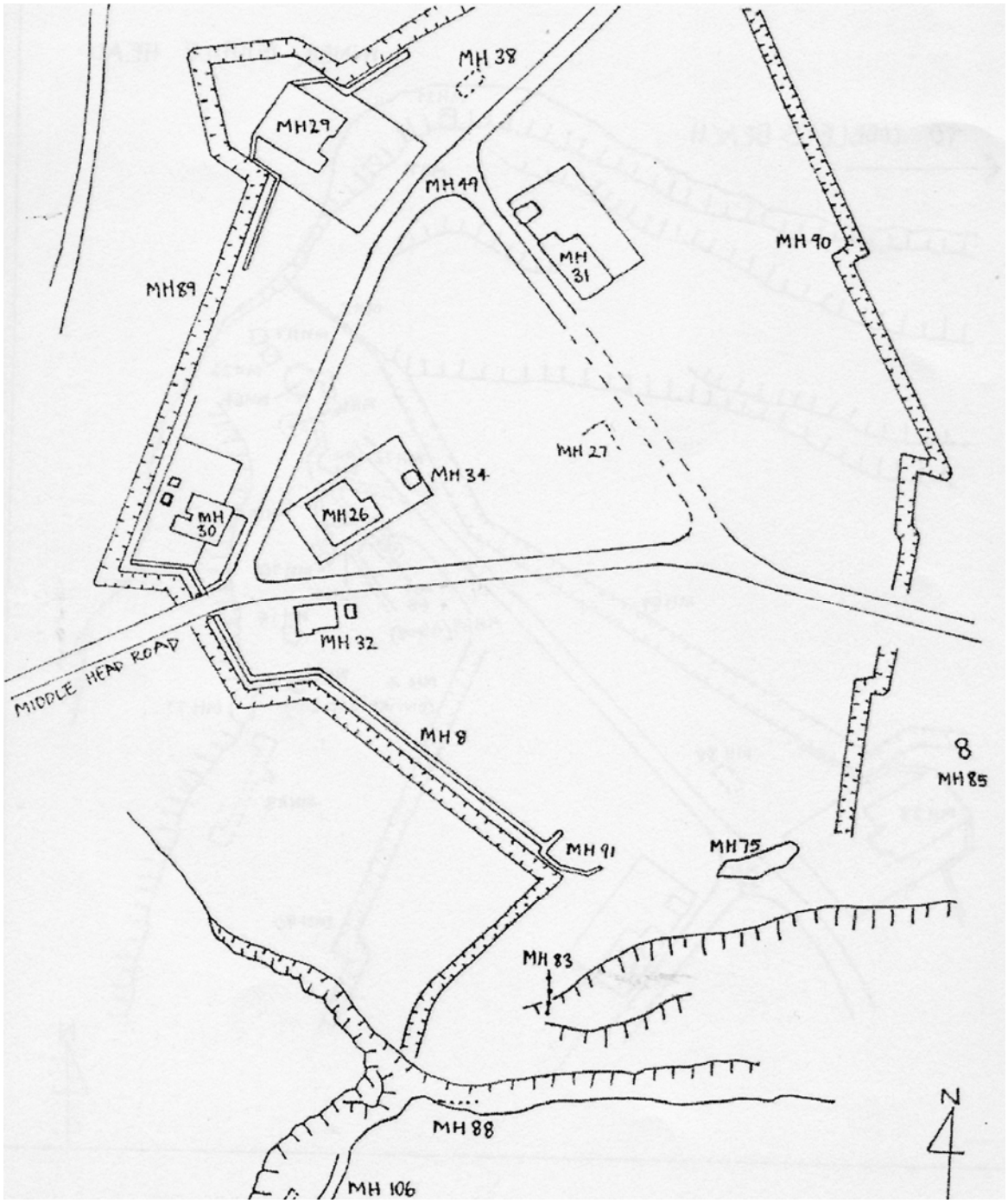
Inner Middle Head



Inner Middle Head, Fortifications Site Plan – Gojak.



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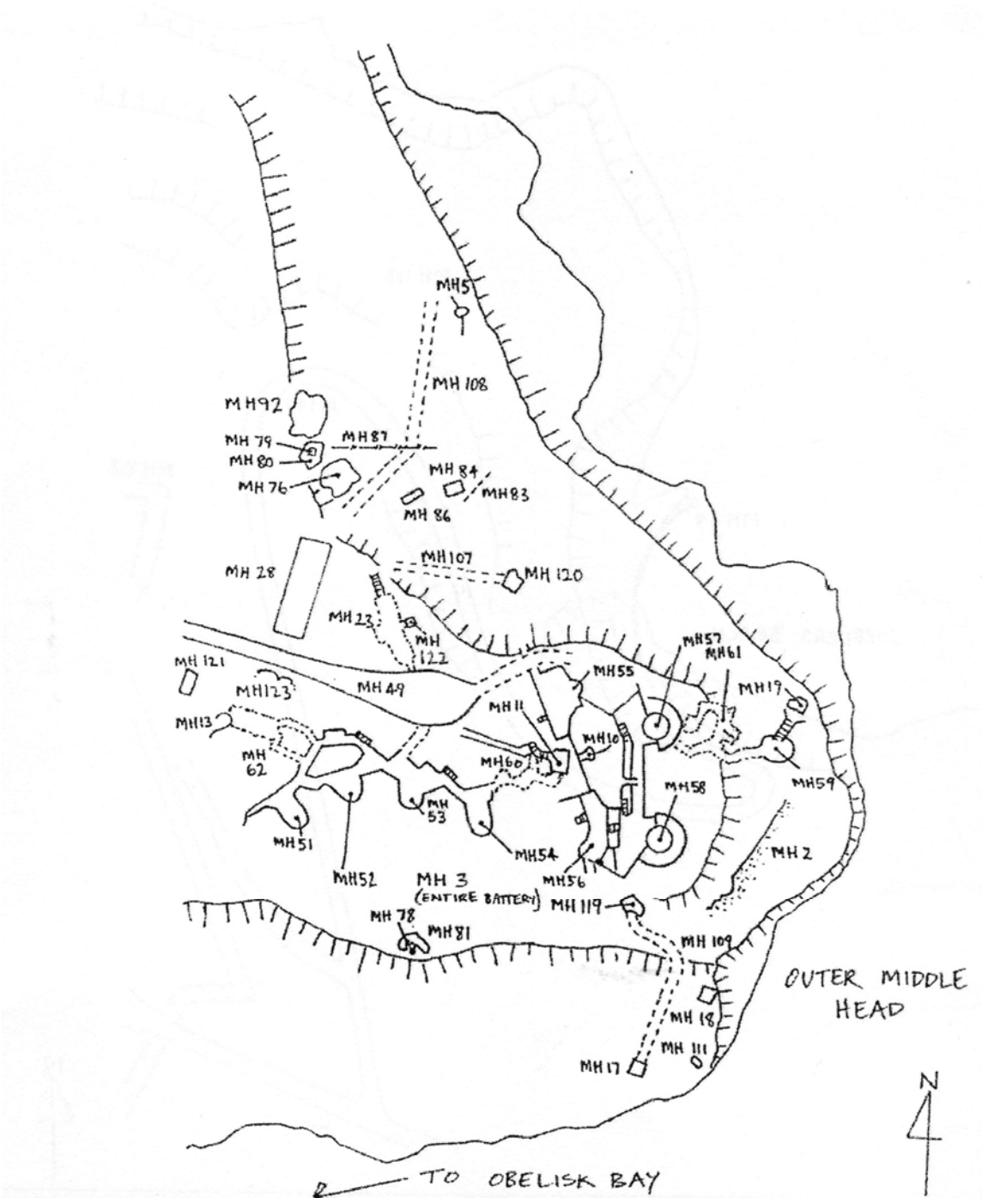
Outer Middle Head



Outer Middle Head Site Plan – Gojak.

Composite aerial photograph of the Middle Head/Georges Head Area showing the relationship of elements, bushland and access roads.

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North Head

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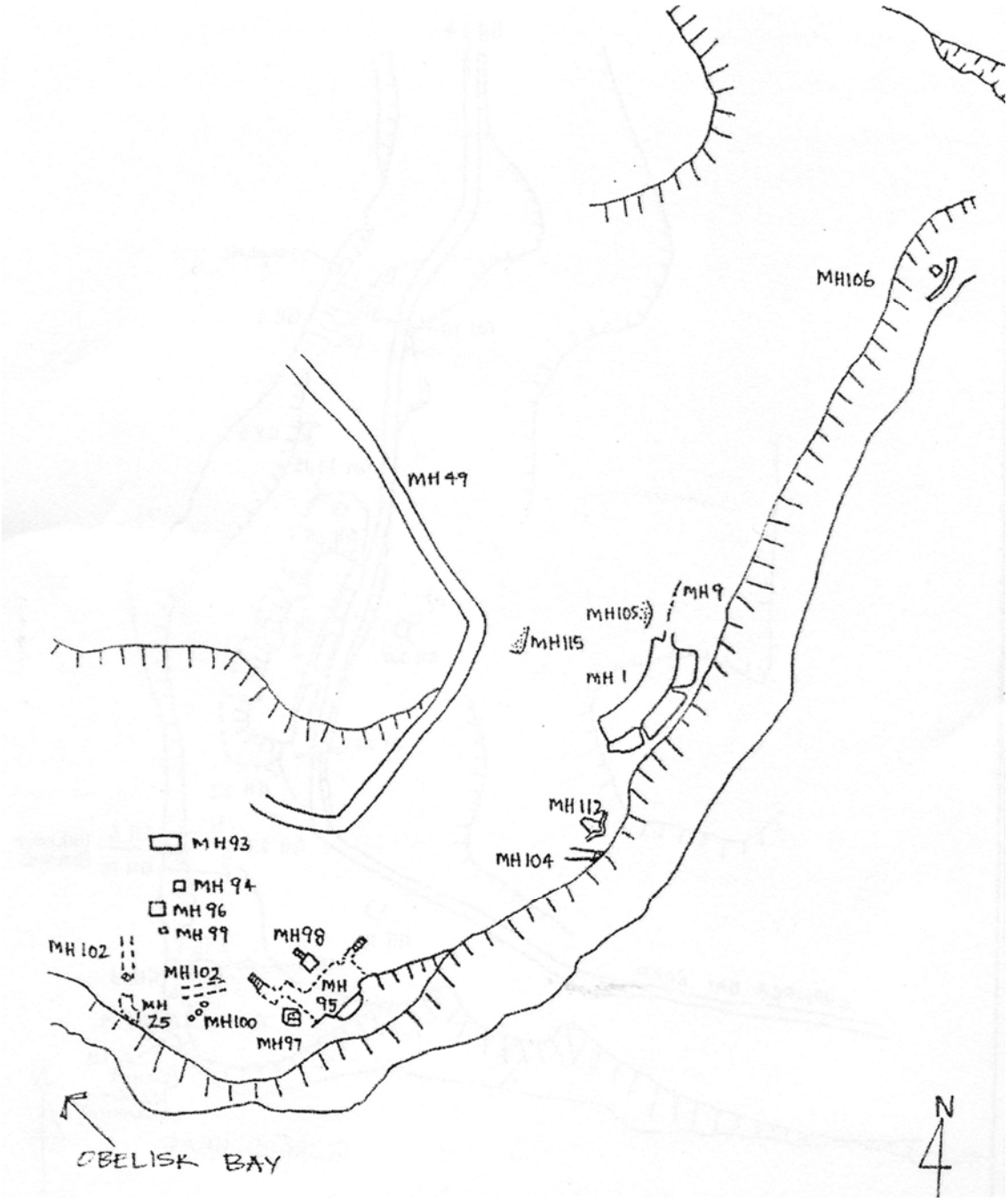
Obelisk Point



Obelisk Point Site Plan – Gojak.

Key Features:

MH1 1801 Battery

MH 95 Case Battery

MH12 Nordentfeld Gun Emplacement

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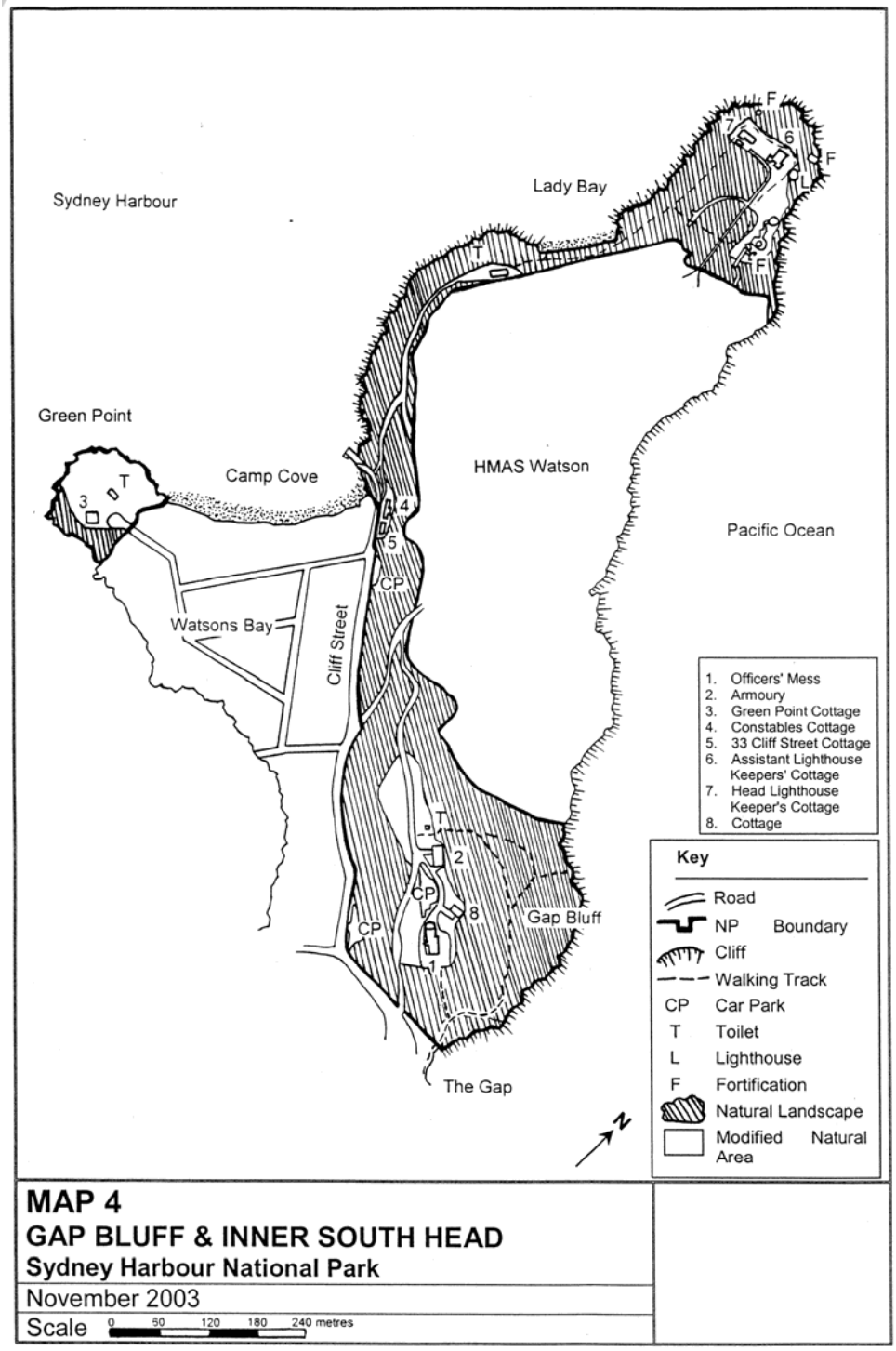
South Head

A 1931 aerial photograph showing the extent of fortifications at South Head and Green Point.



Site Plan of South Head

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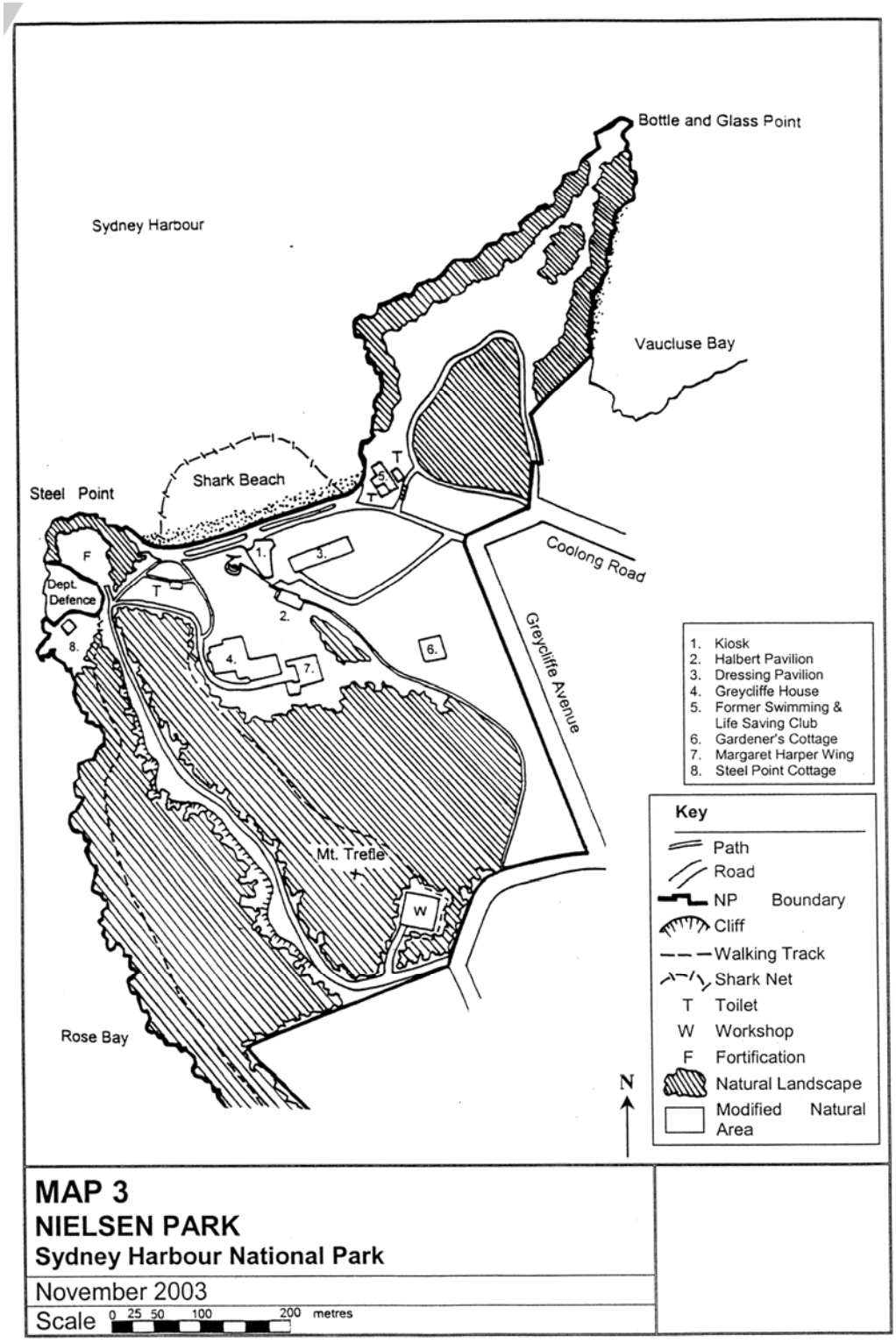


Site Plan of Steele Point Sydney Harbour National National Park Plan of Management 2003

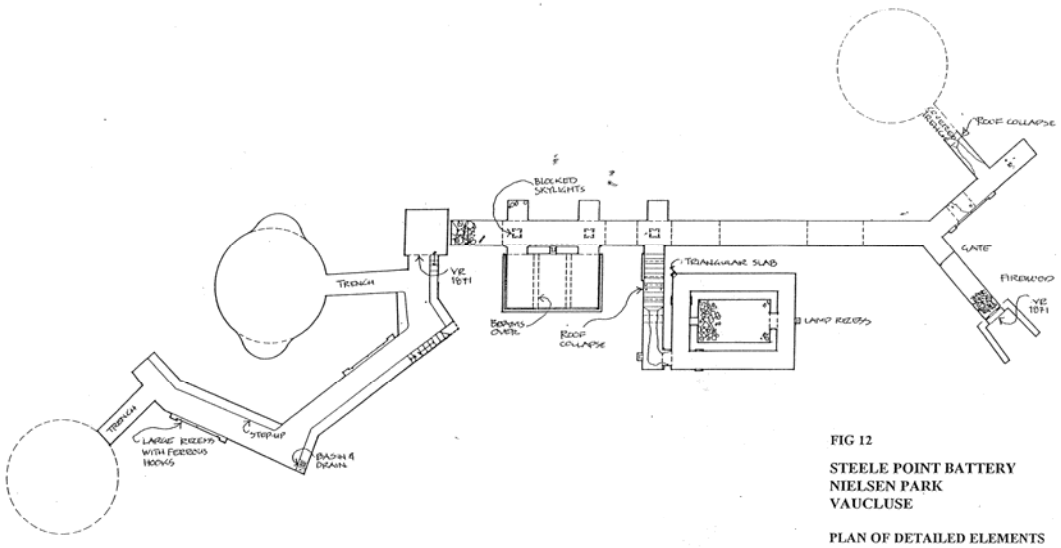
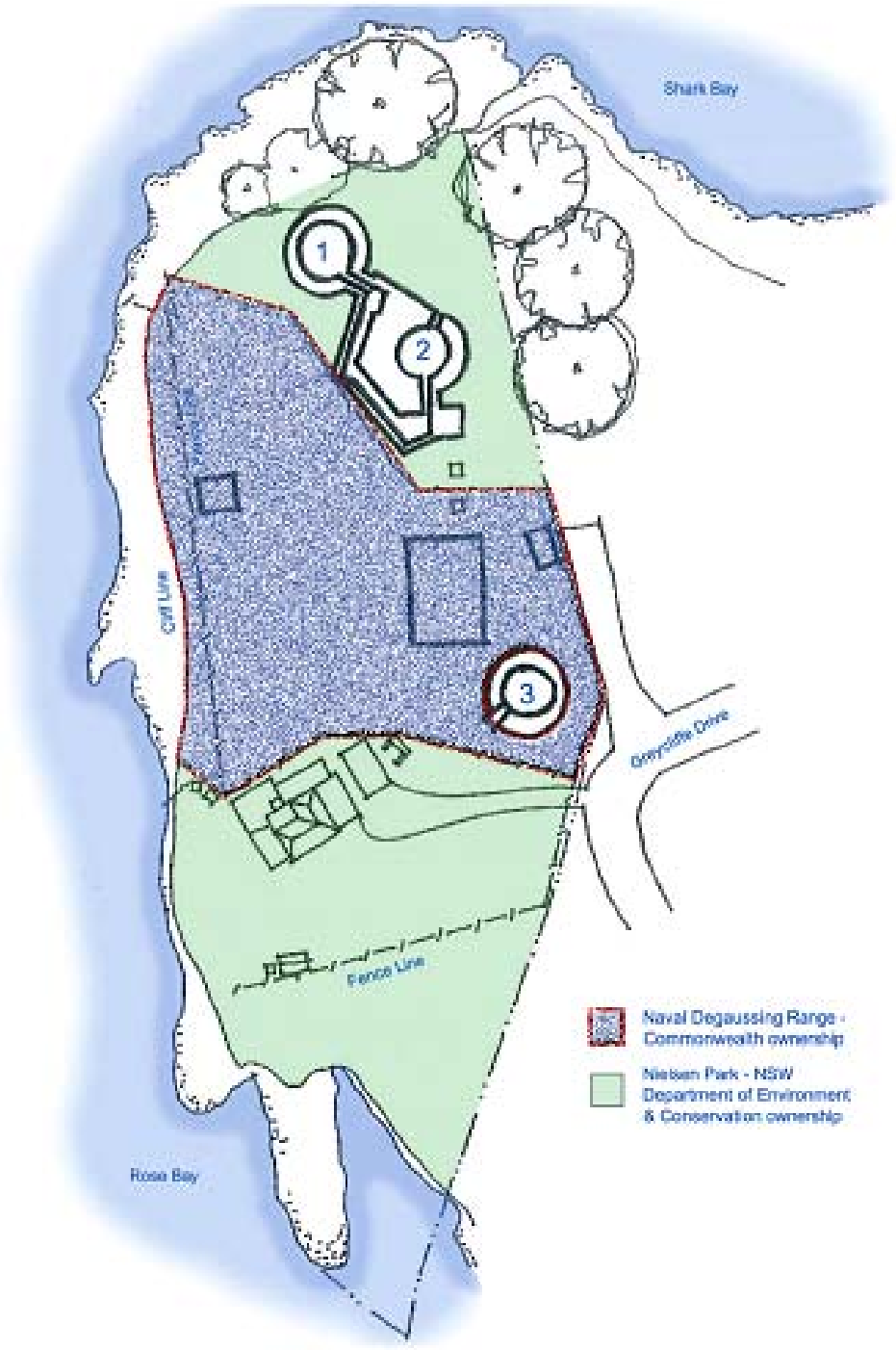


Figure 12: Plan of detailed elements, Tunnels and Gun Emplacements, Steele Point Battery

Conservation Management Plan, June 1996 Biggs, Manefield, Parker, Stairmand, Wong

Diagrammatic layout of fortification noting that the central section of the fort does not form part of NPWS land. NPWS control the two emplacements to the left of the diagram (one infilled) and the entry portal to the right.



Site Plan showing ownership and location of features from CMP.

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