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World Heritage
Patrimoine mondial

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**ORGANISATION DES NATIONS UNIES
POUR L'EDUCATION, LA SCIENCE ET LA CULTURE**

CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

CONVENTION CONCERNANT LA PROTECTION DU PATRIMOINE MONDIAL, CULTUREL ET NATUREL

WORLD HERITAGE COMMITTEE / COMITE DU PATRIMOINE MONDIAL

Forty-second session / Quarante-deuxième session

**Manama, Bahrain / Manama, Bahreïn
24 June - 4 July 2018 / 24 juin -4 juillet 2018**

Item 7 of the Provisional Agenda: State of conservation of properties inscribed on the World Heritage List and/or on the List of World Heritage in Danger

Point 7 de l'Ordre du jour provisoire: Etat de conservation de biens inscrits sur la Liste du patrimoine mondial et/ou sur la Liste du patrimoine mondial en péril

MISSION REPORT / RAPPORT DE MISSION

Nan Madol: Ceremonial Centre of Eastern Micronesia (Federated States of Micronesia) (C 1503)

Nan Madol : centre cérémoniel de la Micronésie orientale (Etats fédérés de Micronésie) (C 1503)

16-25 January 2018 / 16-25 janvier 2018

REPORT ON THE WORLD HERITAGE CENTRE / ICOMOS REACTIVE MONITORING MISSION TO

NAN MADOL: CEREMONIAL CENTRE OF EASTERN MICRONESIA (FEDERATED STATES OF MICRONESIA) (1503)

16 TO 25 JANUARY 2018

ICOMOS
international council on monuments and sites

United Nations
Educational, Scientific and
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World
Heritage
Convention

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EXECUTIVE SUMMARY AND LIST OF RECOMMENDATIONS

A combined World Heritage Centre/ICOMOS mission team visited Pohnpei, Federated States of Micronesia (FSM), from 16-25 January 2018. The team was led by archaeologist and project-manager Professor Ian Lilley, and comprised Mr Charlie Benson, a structural engineer, Dr Peter Cox, a stone conservator, Ms Sachiko Haraguchi, World Heritage Centre Project Officer, and Dr Christophe Sand, archaeologist.

The team met with local stakeholders and made a number of field trips on foot and by boat to the property and related cultural sites in Pohnpei. As per all previous World Heritage reports on Nan Madol, the team found that the values on the basis of which the property was inscribed on the World Heritage List cannot be maintained under the current management arrangements in the face of the range of factors which continue to threaten the property.

Within the various meetings held with the main stakeholders and others, it is obvious the challenges faced by the authorities are immense but, at the same time, need to be addressed through compromises on all sides.

The enormity of the property and of the threats to the property must first be fully understood by all involved. However, despite this and the scarcity of people resources within the traditional leadership which prevails on the island, the mission considers that work should be undertaken, while ensuring that the immediate steps to be taken are the right ones and that they will have a positive effect.

Equally the World Heritage Centre, ICOMOS and possible funders should also take cognisance of this very important and challenging factor.

The property is vast, including some 90+ islets and probably over 120 structures of varying size and state of conservation. The plant and tree life that is evident over the property is extraordinarily large and diverse, while the once well-thought-out channel network is now more or less dysfunctional. Therefore, tackling the property as a whole is impossible, impractical and nonsensical due to this and many reasons: the sheer manpower required to do so is not available; the financial commitment is not available; and the subsequent maintenance of such a large property would be virtually impossible. With this in mind, threats and achievable goals should be set as a first phase of a multi-phase project.

The mission evaluated the major question of vegetation cover of the Nan Madol World Heritage property though a study of photographs from the last 150 years, with the objective to identify changes to the state of the property over this time period and to reach a better understanding of the fill of the channels. It appears that significant variation occurred during the last century and a half, especially with regular cleaning of the burial ground of Nandowas since the Japanese era, this platform being considered as the main visitor attraction of the property. Over most of the time period considered, the main channels appear to have been navigable at high and medium tide at least. Mangrove cover in the Madol Pah area, as well as along the border of Temwen Island, appears, from Hambruch's photographs taken after typhoon destructions in 1908, to be less developed than today. The presence of planted banana trees on numerous pictures reinforces the hypothesis that several fertile platforms of Nan Madol were used on a regular basis by local families for gardening activities, aside from copra collection.

Significant clearing of the main platforms of the property for archaeological mapping, which has taken place since the 1960s, has changed the vegetation cover, especially expanding the hibiscus growth in some places. This has accelerated the rate of wall collapse in the recent past, although it is clear from the study of old photographs that the retaining walls of most of the platforms were already partly ruined when Europeans started to study the

site in the 19th century.

Accordingly, any programme of vegetation removal as part of the short, medium or long-term conservation plan for the World Heritage property of Nan Madol, or for better tourist access, should take into account the complex history of tree and scrub cover of the property over the last generations and the possible consequential damage to the structures. The Nan Madol complex comprises a number of different structural forms that incorporate open joint stacking of naturally-formed basalt stone elements. The basalt elements are effectively 'loose fit' and rely on an interlocking assembly, friction and gravity to provide a structural integrity. The 'debonded' nature of the adjacent elements permits a degree of relative movement that accumulates to give the structures an inherent flexibility. However, neglect over the past centuries has introduced elements of stress to the structures, which has had a very adverse effect, including the decomposition of the coral infill; differential settlement; vegetation; embedded vegetation; collapsed vegetation; subsidence; wave action; tidal erosion and sea level rise.

A staged recovery scheme is proposed, but even this is challenging due to the enormity and rapid growing of plant life within the structures and the canals. The scheme encompasses immediate, short-term (1-3 years), medium-term (3-5 years) and longer-term (5-10 years) actions to rehabilitate key parts of the property, as well as a range of funding options to support the work.

Immediate actions

The immediate actions for the State Party are to:

1. Work with the World Heritage Centre and Advisory Bodies on designing and agreeing a capacity building strategy, identifying external qualified specialists and designing an intense local training programme;
2. Clear vegetation (Nandowas and currently-navigable waterways) - see map in annex;
3. Commence a training programme;
4. Invite experts to train and design methodologies;
5. Create an international workshop on site as part of capacity building;
6. Design and stabilise the two sea wall sections identified for immediate action;
7. Remove and re-build all pedestrian bridges as described in the engineering report annexed to this mission report;
8. Upgrade the pedestrian footpaths to make them safe;
9. Identify compatible partners such as US National Parks; Government of Japan; Government of the Phillipines etc.;
10. Identify national focal point and confirm who is producing the Desired State of Conservation for the Removal of the property from the List of World Heritage in Danger (DSOCR).

A DSOCR cannot be developed in the early stages of this project. Instead, as areas are cleared of vegetation and surveys can be taken, a phased DSOCR will be developed, as follows:

Short-term actions

The following constitute the short-term actions for the property (i.e. to be undertaken 1-3 years after the State Party receives this report):

- Implement the Management Plan (including tourism plan) - this appears to the mission to be well-advanced;

- Ensure the continued and long term full functioning of Nan Madol Historic Preservation Trust;
- Pending funding, to have the Cultural Centre be built, fitted-out and fully-functioning;
- Identify trained masons and design and write specifications and methodologies for the varying type of stone re-construction, stone stabilisation, stone propping and other essential stone repairs;
- Implement the major stonework stabilisation, which is well-advanced at Nandowas, Nanmwoluhsei A-C seawalls, Pahnwi A Islet and the Peinkitel platform;
- Start silt management in key areas around Nandowas and Peinkitel platform and, as required/feasible, through major water access routes through the centre of the property (with archaeological and other specialist input/oversight as required);
- Continue vegetation management at Nandowas, Peinkitel and land and water access-routes, and extend this as feasible to other major platforms;
- Continue capacity-building in vegetation management and stonework stabilisation and begin capacity-building for silt management;
- Continue the systematic archival review of historical and recent photographs.

Medium-term development

To ensure the long-term viability of the whole property, much consideration should be given to strengthening the outer sea walls – constant weather storms, hurricanes and rise in sea level will have a long-term impact on the site. Serious consideration should be given to this fact, as well as the following measures:

- Restoring all other structures on the property;
- Clearing and opening as many other canals as is possible;
- Ongoing management of vegetation;
- Improvement of access from both sea and for pedestrians;
- Long-term management should also take into consideration managing the number of tourists allowed to visit the property.

The main challenge of this World Heritage property is the enormity of the property and its accessibility, the difficulty in evaluating the structures and canals due to heavy vegetation cover, the understanding of the hydrology to have the canals working as they should once clearance has commenced, and the complexity of external expert help that the State Party will require to even start this process.

If a significant immediate plan is not put in place, much of this property could be lost within a very short time.

1. BACKGROUND TO THE MISSION

1.1. INSCRIPTION HISTORY

Nan Madol is reputed to date from the 13th century, and is of a truly unique construction. The material is all large-scale Basalt in a mix of very large rocks but mostly with polygonal columns ranging from 3 to about 6 metres in length and an average of some 500mm in diameter. The common structure is of a double skin wall which is infilled with coral, and the size of the structures vary as to their original purpose and function. The bulk of damage caused to these robust structures has been caused by the fallen trees and large tree roots routing through the structures and causing physical damage. There is also a lot of other lighter growth, such as ivies, small bush-like plants, and, of course, mangroves. Removing all of these over time will be time-consuming and requires delicate work so as not to undermine any structures.

The canals are also in a very advanced state of decay due to silting and mangrove growth on a very large scale. There are two important sea wall defence structures that do need urgent addressing to be stabilised.

Access to the property as it is today is difficult, and this should be addressed in the DSOCR and in the greater Management Plan for the property.

Nan Madol: Ceremonial Centre of Eastern Micronesia is a series of more than 100 islets off the south-east coast of Pohnpei that were constructed with walls of basalt and coral boulders.

These islets harbour the remains of stone palaces, temples, tombs and residential domains built between 1200 and 1500 CE. These ruins represent the ceremonial centre of the Saudeleur dynasty, a vibrant period in Pacific Island culture. The huge scale of the edifices, their technical sophistication and the concentration of megalithic structures bear testimony to complex social and religious practices of the island societies of the period.

Nan Madol: Ceremonial Centre of Eastern Micronesia was inscribed in 2016 as a cultural property under criteria (i), (iii), (iv) and (vi). The property was also inscribed on the List of World Heritage in Danger at the same time, with the agreement of the State Party. The threats include the siltation of the waterways that is contributing to the unchecked growth of mangroves and undermining existing stone edifices.

The Danger listing was seen as a means of defining a conservation project for the stabilisation of the stone structures, clearing mangroves, removing accumulated silt, and re-instating waterways around the individual islets of Nan Madol, and these were also noted at the time of inscription.

The State Party acknowledged that the property's conservation needed to be clearly defined, that support of donor funding was needed, and that expertise and the building of local capacity would both be essential to achieve a stable state of conservation.

Accordingly, at its 40th session, at the time of inscription of the property on the World Heritage List, the World Heritage Committee requested the State Party of the Federated States of Micronesia to invite a joint World Heritage Centre (WHC) / ICOMOS Reactive Monitoring mission to Nan Madol World Heritage property (Decision 40 COM 8B.22).

The Committee Decision 41 COM 7A.56 clarified that the mission would consider a draft Desired State of Conservation for the Removal of the property from the List of World Heritage in Danger (DSOCR) and that this should aim to reflect both the long timeframe needed for the major project to stabilize the extensive stone remains, and the need to define a

point at which the main threats had been mitigated to an acceptable degree before the overall project has been completed'.

The mission team suggest that a detailed DSOCR cannot be written now, as much of the property is totally overgrown by vegetation and other areas are extremely difficult to access. A DSOCR will thus be developed on a phased basis as areas are cleared of vegetation and surveys completed.

1.2. INSCRIPTION CRITERIA AND OUTSTANDING UNIVERSAL VALUE

1.2.1 Statement of Outstanding Universal Value

(as per "Brief synthesis" http://whc.unesco.org/en/list/1503)

The megalithic basalt stone structures of the more than 100 islets that form Nan Madol off the shore of Pohnpei Island comprise the remains of stone palaces, temples, mortuaries and residential domains. They represent the ceremonial centre of the Saudeleur dynasty, an era of vibrant Pacific island culture which underwent dramatic changes of settlement and social organisation 1200-1500 CE. Through its archaeological remains, Nan Madol is tangibly associated with Pohnpei's continuing social and ceremonial traditions and the authority of the Nahnmwarki.

***Criterion (i)**: The outstanding monumental megalithic architecture of Nan Madol is demonstrated by the wall construction using massive columnar basalt stones, transported from quarries elsewhere on the island, and laid using a distinctive 'header- stretcher technique'.*

***Criterion (iii)**: Nan Madol bears exceptional testimony to the development of chiefly societies in the Pacific Islands. The huge scale, technical sophistication and concentration of elaborate megalithic structures of Nan Madol bear testimony to complex social and religious practices of the island societies.*

***Criterion (iv)**: The remains of chiefly dwellings, ritual/ceremonial sites, mortuary structures and domestic sites combine as an outstanding example of a monumental ceremonial centre illustrating the period of development of chiefly societies from around 1000 years ago, associated with increasing island populations and intensification of agriculture.*

***Criterion (vi)**: Nan Madol is an expression of the original development of traditional chiefly institutions and systems of governance in the Pacific Islands that continue into the present in the form of the Nahnmwarki system under which Nan Madol is traditionally owned and managed.*

Integrity

Nan Madol includes all elements necessary to express it Outstanding Universal Value and is of adequate size to ensure the complete representation of features and processes which convey the property's significance. There are no intrusive elements from development or modification, and no reconstructions of the original elements. Due to cessation of use for residential purposes by the 1820s, while retaining religious and traditional significance, the property suffers from overgrowth of vegetation, the effects of storm surge and some stonework collapse. The state of conservation of stone structures is now of extreme concern, rendering the integrity of the property vulnerable.

Authenticity

The property is authentic in terms of location and setting, intangible culture, spirit and feeling, materials, form and design. The overgrowth of the stone structures and their state of conservation means that many of them are unable to be seen, rendering authenticity vulnerable.

Protection and management requirements

Nan Madol is legally protected by the federal government and administered by the Office of National Archives, Culture and Historic Preservation (NACH) through the Historic Preservation Office of the Federated States of Micronesia (FSM). It is protected by the state government of Pohnpei under the Pohnpei Historic and Cultural Preservation Act (2002), administered by the Pohnpei Historic Preservation Office. The FSM Constitution acknowledges the customary interests of the traditional chiefs and the property is customarily protected by the Nahnmwarki Madolenihmw[1].

A management committee has been set up involving all stakeholders including traditional owners and this collaboration will be consolidated by passage of the proposed Bill LB 392 (expected to pass in October 2016) to create a Nan Madol Historic Preservation Trust with ownership and management under traditional oversight by the Nahnmwarki Chief. The Management Plan was expected to be completed with international financial and technical assistance by mid-2017. This will include appointment of a designated property manager trained in cultural resource management and strategies for risk preparedness, conservation and tourism as well as an ongoing maintenance and monitoring program.

1.2.2 Integrity/authenticity issues raised in the ICOMOS evaluation report at time of inscription

At the time of inscription, the ICOMOS Evaluation noted the following with regard to Integrity and Authenticity:

- Integrity

ICOMOS considers that the state of conservation of the stone structures is of extreme concern, and that their neglect over centuries of abandonment makes the integrity of the property vulnerable.

- Authenticity

ICOMOS considers that the state of conservation of the stone structures with many of them completely overgrown and therefore unable to be seen and understood means that authenticity is vulnerable.

1.3. EXAMINATION OF THE STATE OF CONSERVATION BY THE WORLD HERITAGE COMMITTEE

The property was simultaneously inscribed on the World Heritage List and the List of World Heritage in Danger in 2016 at the 40th session of the World Heritage Committee in Istanbul,

[1] Note that each of the four rural municipalities of Pohnpei has its own Nahnmwarki as paramount chief. The municipalities have the same boundaries as the paramount chiefdoms. The capital, Kolonia, is a separate, independently-administered fifth municipality excised from one of the chiefdoms during the colonial period. The Nahnmwarki Madolenihmw has authority only in the Madolenihmw municipality, where Nan Madol is situated.

Turkey, by Decision **40 COM 8B.22.** Threats identified in 2016 were:

1. Lack of legal framework (legislation LB392 not yet passed and implemented);
2. Insufficient extension of the management system;
3. Lack of incorporation of a risk preparedness strategy as well as of a comprehensive tourism strategy into the Management Plan;
4. The need to remove silt from the waterways without jeopardizing possible cultural layers on the sea floor.

The World Heritage Committee recommended the State Party give urgent consideration to the following:

a) passing and implementing the new legislation LB 392 (expected by October 2016) which will create a Nan Madol Historic Preservation Trust with ownership and management under traditional oversight by the Nahnmwarki Chief with a Board of traditional authority and will permanently consolidate the resolution of issues regarding ownership and management that was established by the MoU,

b) extending the management system to include a designated property manager trained in cultural resource management,

c) developing the management plan to:
- *(i) include a risk preparedness strategy,*
- *(ii) extend the current maintenance program to the full area of the property including removal of silt from the waterways without jeopardizing possible cultural layers on the sea floor,*
- *(iii) include the conservation strategy project and corrective measures required to achieve the desired state of conservation,*
- *(iv) include a comprehensive tourism strategy to deal with the future impact of tourism on the property;*

d) considering the new UNESCO recommendation on the protection and promotion of museums and collections (17 November 2015) and using the proposed museum to disseminate the Outstanding Universal Value of the property.

On 31 January 2017, the State Party submitted a state of conservation report, in accordance with the request of the World Heritage Committee at its 40th session, and the report was examined at the 41st session of the World Heritage Committee (**41 COM 7A.56**).

The Committee noted that the mission would consider a draft Desired State of Conservation for the Removal of the property from the List of World Heritage in Danger (DSOCR) and that this should aim to reflect both the long timeframe needed for the major project to stabilize the extensive stone remains, and the need to define a point at which the main threats had been mitigated to an acceptable degree before the overall project has been completed.

The Committee also noted with regret that work on adopting legislation LB 392 and the appointment of cultural heritage staff have been delayed and urged the State Party to make progress on these matters so that a Nan Madol Historic Preservation Trust can be set up and become operational.

1.4. JUSTIFICATION OF THE MISSION

Following an invitation from the Office of National Archives, Culture and Historic Preservation (NACH) of the FSM, the joint World Heritage Centre/ICOMOS Reactive Monitoring mission to Nan Madol: Ceremonial Centre of Eastern Micronesia (FSM) took place from 16 to 24

January 2018.

In 2016, the State Party submitted an International Assistance Request for $30,000 for the drafting of a Conservation Plan and for carrying out preliminary work on clearing the vegetation and waterways. This request was approved in March 2017. The drafting of the Conservation Plan will be carried out following the Reactive Monitoring mission. Dr Christophe Sand, the archaeologist who is to draft the Conservation Plan, was part of the mission team.

Owing to the complexity of the property and technical concerns regarding stone collapse at the property, inputs from several technical experts were required to assess conservation and management requirements. Thanks to financial support from the Netherlands Funds-in-Trust at UNESCO, a multi-disciplinary Reactive Monitoring mission team consisting of an archaeologist, stone expert, structural engineer and project management specialist were able to undertake this task.

The overall aim of the mission was to discuss and agree with the State Party the main parameters of the Conservation Strategy and its conservation projects, a defined project management approach for delivering the projects, a strategy for attracting international assistance, and the drafting of a DSOCR. These individual elements are set out as follows:

a. *DSOCR*
   Advise on drafting of a Desired State of Conservation for the Removal of the property from the List of World Heritage in Danger (DSOCR). Such a DSOCR needs to be based on an assessment of the state of conservation of the property;

b. *Surveys and Documentation*
   Consider the scope of existing surveys and documentation of the property and advise on future needs;

c. *Conservation*
   Consider the overall state of conservation of stone remains and water channels and identify specific challenges facing the property;

d. *Conservation Strategy*
   Consider the scope of a Conservation Strategy in terms of short, medium and long term projects to stabilise the stone remains and open up the clogged and silted waterways;

e. *Resources*
   Consider the current resources available to the property for conservation, their structures, and identify how these could be strengthened and augmented to address conservation projects;

f. *Project Management Approach*
   In the light of the remoteness of the property, the scale of the conservation problems and the currently limited resources, advise on appropriate project management structures;

g. *Strategy for International support*
   Based on an agreed approach to a conservation strategy and project management, advise on a strategy for attracting support from international donors.

The Terms of Reference and the mission programme are included in annexes 8.4 and 8.6 respectively.

The Reactive Monitoring mission team was composed of:

- Prof Dr Ian LILLEY, ICOMOS (Mission Lead, archaeologist and project-management advisor)
- Mr Charlie BENSON, ICOMOS (structural engineer)
- Dr Peter COX, ICOMOS (stone conservator)
- Ms Sachiko HARAGUCHI, Coordinator, World Heritage Programme for Small Island Developing States (SIDS), UNESCO World Heritage Centre
- Dr Christophe SAND, ICOMOS (archaeologist)

2. NATIONAL POLICY FOR THE PRESERVATION AND MANAGEMENT OF THE WORLD HERITAGE PROPERTY

2.1. NATIONAL LEGISLATION

The relevant national laws and regulations concerning the World Heritage property include:

1. National Historic Landmark (1986) administered by the Office of National Archives, Culture and Historic Preservation (NACH) through the Historic Preservation Office of the FSM.

2. Pohnpei Historic and Cultural Preservation Act (2002), by the State Government of Pohnpei, administered by the Pohnpei Historic Preservation Office.

3. The property is customarily protected by the Nahnmwarki Madolenihmw.

4. Prior to independence, Nan Madol was included on the United States (US) National Register of Historic Places.

The mission was informed that new legislation for "the Protection of World Heritage Sites and their Buffer Zones" is under preparation. This will include proposals to create a Nan Madol Historic Preservation Trust.

2.2. INSTITUTIONAL FRAMEWORK AND MANAGEMENT STRUCTURE

The municipality of Madolenihmw is responsible for the day-to-day protection of Nan Madol, including keeping stonework clear of damaging vegetation. To this end, some maintenance is currently funded by the Pohnpei Office of Tourism. Private use of the property was revoked under the 2002 Act, but the actual deterrent is the authority of the Nahnmwarki Madolenihmw.

It is noted that for Pohnpean people, access to the property is customarily restricted to people from within the Madolenihmw municipality and primarily to people from the communities traditionally associated with the site. Thus, day-to-day maintenance has to be done by local people, though the input and oversight of the Pohnpei HPO and national heritage agency is permitted.

The proposed Nan Madol Historic Preservation Trust will confirm ownership and management under traditional oversight by the Nahnmwarki Chief with a Board of traditional authority. This is expected to permanently consolidate the resolution of issues regarding ownership and management that was established by the Memorandum of Understanding (MoU).

It was expected to be passed by October 2016 and then by April/May 2017, but it had not been passed at the time of the Reactive Monitoring mission in January 2018.

Following a Nan Madol capacity-building workshop in 2012, a draft management system was developed for Nan Madol. It is intended that management of the property will be co-ordinated by a Nan Madol World Heritage Management Committee under the Nan Madol World Heritage Board. Members of the Nan Madol World Heritage Board include the Nahnmwarki Madolenihmw, the Municipal Chief Magistrate, State Governor, land owners adjacent to the site, three section chiefs from Temwen Island, national government representatives and technical advisors as required. A diagram of the proposed management structure presented below:

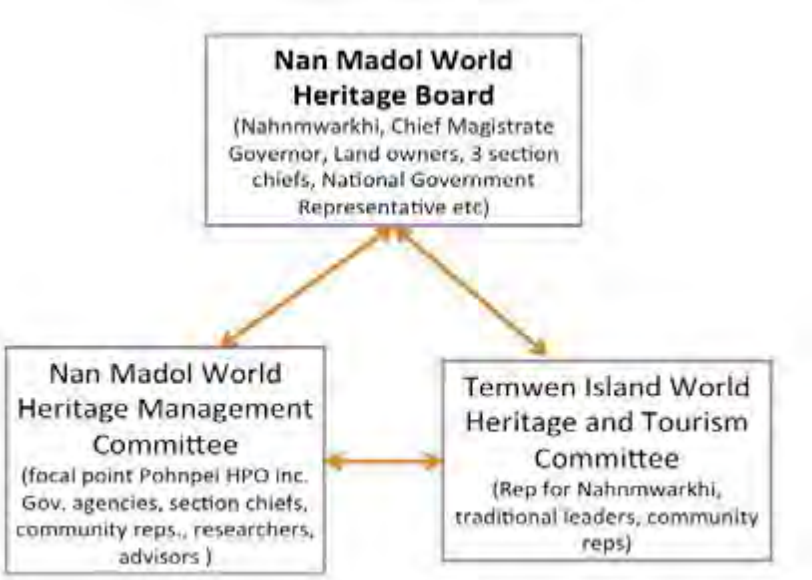


Figure 1. Proposed management structure of the Nan Madol World Heritage Property management system (p112, nomination file)

The Board and Management Committee also link to the Temwen Island World Heritage and Tourism Committee, which first met in April 2014, but has not met since.

The FSM Office of National Archives, Culture and Historic Preservation (NACH) was funded by the FSM government. Direct financial support to Nan Madol is provided by the Pohnpei Office of Tourism. Other institutions involved in the preservation of Nan Madol as a tourism resource include the FSM Department of Resources and Development and the Pohnpei Department of Land and Natural Resources.

The “Nan Madol Historic Preservation Trust” proposed under the new Legislation (LB 392) aims to oversee this management structure.

An outline and process for the development of a comprehensive management plan for Nan Madol was discussed at the first management committee meeting. However, the World Heritage Management Board and Committee have not been held since the first meeting, and the Management Plan has not yet been finalized.

3. IDENTIFICATION AND ASSESSMENT OF ISSUES

3.1 MANAGEMENT EFFECTIVENESS

As has been made clear in the foregoing text and in all preceding reports on the property including the ICOMOS evaluation of the nomination, the effectiveness of the management of Nan Madol is severely compromised by:

- a lack of legislation enabling a dedicated government authority to manage the property;
- a lack of a comprehensive management plan (including tourism management).

This situation is compounded by:

- the geographical extent of the property;
- the scale and complex construction of the individual structures it encompasses; and
- a lack of human and financial resources on the part of the State Party.

Although on paper there are national and state heritage preservation agencies with responsibilities including Nan Madol, as well as other national, state, municipal and traditional/customary interests in the property, there are in reality only two individuals, one national (i.e. FSM) and one state (i.e. Pohnpei), with direct day-to-day input into the management of Nan Madol. They operate on extremely limited budgets and the World Heritage property is only one of their responsibilities. Both do the best they can within those constraints, but they face an almost impossible task and require urgent assistance and support to improve management effectiveness.

3.2 FACTORS AFFECTING THE PROPERTY (see annexes 8.1-8.3)

In addition to compromised management effectiveness, and also emphasised in all previous reports including the initial ICOMOS evaluation, the principal threats to the property are:

- vegetation on and around the structures;
- stonework collapse;
- siltation of the canals; and
- wave-action.

Large trees, especially planted species such as breadfruit and coconut, are destructive whether alive, decaying in-place after death or falling on the property when cut down, following natural death or owing to natural factors such as storm-surges or high winds. However, smaller plants, such as various vines and the ubiquitous wild hibiscus, the spread of which is uncontrolled on the property, are also damaging. Mangroves, some species of which can grow very large, are also affecting the structures by growing on and near them. However, it is noted that in places exposed to wave action, mangroves also help to buffer the property.

Compounding their physical impact on the stonework at the property, mangroves are exacerbating siltation of the canals by trapping sediment in their dense root systems. Yet despite the focus in all previous reports on the vegetation on and around the property, as well as other factors such as sediment flow from Temwen Island, the main cause of siltation appears to be a lack of continual large-scale seawater circulation through and past the property following the construction of the substantial causeway linking Temwen and the Pohnpei mainland. This has been noted in previous reports and indeed the nomination dossier itself (p. 97) but has not been given sufficient emphasis. Historical records clearly show sedimentation was occurring before the construction of the causeway, but at a much reduced rate in comparison with the

present situation that developed after the causeway was finished (Annex 8.3).

The effects of the main causeway are amplified to varying degrees by a number of much smaller causeways within the property that were built to facilitate access on foot (see photographs in Annex 8.8). As noted in several previous reports, these smaller structures can block the free flow of tidal water in parts of the property, primarily on the main tourist path that leads to Nandowas (structure 113)[2]. That said, recent photographs show that very high tides can completely swamp large parts of the property despite the small causeways.

These problems have been noted repeatedly and in detail in all previous reports on the property, including the successful nomination dossier. Despite some comments in past reports, wave action does not appear to be a major issue across most of the property. Rather, there are serious concerns about specific places, notably the southwest corner of the main sea wall (Pahnwi A Islet; structure 9) and in sections of some of the smaller angled seawalls around Nandowas (Nanmwoluhsei A-C, structures grouped as 119; see Annex 8.1).

3.3 SPECIAL NOTE ON INTEGRITY AND AUTHENTICITY

It should be noted that in addition to the matters noted in the ICOMOS evaluation of the property prior to inscription, an unknown quantity of stone material has been removed, repurposed and rearranged over an unknown period of time for tourist works and archaeological study, possibly including some reconstructions, especially in the vicinity of Nandowas and on other major platforms. In addition, it is known that human remains and associated grave goods were removed from various burials at the property, including in Nandowas. An unknown quantity of other cultural material, archaeological and ethnographic, has also been removed from the site over the last 150 years.

[2] This report follows the spellings and numbering of the nomination dossier, Fig 2.4 and Table 2.1, pp 27-28.

4. ASSESSMENT OF THE STATE OF CONSERVATION OF THE PROPERTY

There is no need to repeat recent findings regarding the state of conservation of the property. As all previous reports have unambiguously indicated, the values on the basis of which the property was inscribed on the World Heritage List cannot be maintained under the current management arrangements in the face of the range of factors which continue to threaten the property. That is why Nan Madol was put on the List of World Heritage in Danger at the time of inscription and why the present Reactive Monitoring Mission was conducted.

It should be noted, however, that while new management legislation has not yet been passed, good progress is being made, relative to resourcing and administrative opportunity. The Reactive Monitoring mission team received copies of a Law for the Protection of World Heritage Sites and their Buffer Zones (Draft) and A BILL FOR AN ACT: Adding a new Chapter 2 to Title 22 of the Pohnpei Code to establish the Nan Madol Historic Preservation Trust; and for other purposes (Draft). These drafts are a very positive sign that the State Party is advancing its plans to improve the state of conservation of Nan Madol.

4.1 SURVEYS AND DOCUMENTATION

The mission team investigated and studied all known surveys and documentation, and are grateful to the State Party, Doug Comer and John Peterson for making documents available and for attending the workshop held by the team on potential collaboration.

It is intended that as areas are cleared, accurate surveys should be taken and pieced together over time.

5. DEVELOPMENT OF A LONG-TERM CONSERVATION STRATEGY

A Conservation Strategy needs to set out what is to be conserved, what type of interventions are envisaged, what surveys and analysis need to be undertaken, how will work be carried out (what type of management structures) and over what time frame, and where will the necessary resources and necessary expertise come from, and needs to be agreed between all parties.

A Conservation Strategy is a methodology to advise immediate actions of conservation –a conservation plan is a road map to conserve a site or building– and also incorporates within a conservation plan detailed specifications for the implementation of all interventions, many of which are not possible at this time due to the size of the property, restricted access due to vegetation growth, and the canals being blocked by silting and vegetation growth.

Work needs to progress regarding Nandowas, the canals, and the pedestrian route in order to then be able to create a more detailed conservation plan or DSOCR.

5.1 FRAMEWORK OF THE CONSERVATION STRATEGY

This report concurs with all previous reports that action is urgently required to strengthen the management of Nan Madol and undertake immediate, medium- and longer-term work at the site to ensure the values for which the property was inscribed on the World Heritage List can be maintained.

To this end, we recommend that the Strategy is divided into immediate, medium-term, long-term and indefinitely-continuing future activities. It should be noted that, owing to the geographic extent of the property, the physical scale of the structures it encompasses, and the reality that resources for conservation at the property will always be limited, attention is focussed on key areas within Nan Madol rather than attempting unrealistically to include the entire property.

If funding is gained, then the work for immediate attention can be initiated within a short time frame.

5.2 **IMMEDIATE ACTION** (12 months after State Party receives this report)

a) Conservation Actions

Clearing vegetation (Nandowas and waterways)
As made clear in the technical annexes to this report, it is imperative that the vegetation is cleared from Nandowas without delay. This structure (113) is the “jewel” of the property for visitors but it is threatened by continued and possibly catastrophic stonework collapse, owing to vegetation growth and especially the presence of large trees.

Vegetation must also be trimmed along currently-navigable water-access routes. This action will allow continued high-tide access by watercraft right through the property from the southwest corner adjacent to Temwen Island then northeast all the way to Nandowas. The route passes between the major platforms in the middle of the property, including the administrative centre and royal residence Pahnkedira (structure 33) and various other platforms including the one with the pool of the sacred eel known as the “Rainbow’s Ear”. This water-route is now open and allows visitors to see much more of the property than using only the footpaths leading from Temwen to Nandowas. Trimming will allow this current situation to be maintained.

b) Management Actions

The trimming along the waterways and removal of lighter vegetation from Nandowas can be done by local maintenance personnel, as it is now.

Removal of the larger vegetation from Nandowas must be done by qualified and certified professional arborists and/or tree-surgeons, with such input as funding allows from archaeological, stone-conservation and engineering specialists and local stakeholders. This is an ideal opportunity to a) upskill and capacity build local people and b) to retain, cut and recycle good timber for the new proposed bridges across various canals.

Pending funding, capacity-building training should begin immediately with regard to specialised vegetation clearing, under the oversight of the accredited tree-removalist.

5.3 MEDIUM-TERM ACTION (3-5 years after State Party receives this report)

a) Conservation Actions

Vegetation management should be continued at Nandowas and along major land and water access-routes. Vegetation control should also be extended on the same basis to the Peinkitel structure (55) on the Temwen mainland beside the access path to Nandowas. Work at Peinkitel will open an additional part of the property that can be readily visited by tourists.

Stonework stabilisation should commence at Nandowas (113), seawalls Nanmwoluhsei A-C (119), Pahnwi A Islet (9) and the Peinkitel platform (55), as per the specialist reports (annexes 8.1 and 8.2). This work must be carried out by qualified and accredited experts (local, if possible).

Removal of all causeways along the footpaths to Nandowas as well as any other modern artificial barriers to water movement within the property is also an immediate priority. The causeways can be easily replaced by light bridgework of the sort which exists on-site now, constructed in ways which do not impede water movement.

Surveys should be carried out as areas are cleared of vegetation. Relevant surveys of all elements should be carried out using ground surveys, lidar, high level drone surveys and surveys of all built elements, and these surveys should include present conditions of all masonry.

b) Management Actions

Capacity-building should continue with regard to vegetation management, and should begin with specific tasks in stonework conservation (e.g. “stone-pinning”).

Legislation (LB 392) should be passed.

Nan Madol Historic Preservation Trust should have been created and be fully-functioning.

A comprehensive Management Plan including tourism management should be completed.

Construction of the Cultural Centre should have commenced (pending funding that is currently being sought from the Japanese Government. The funding under consideration covers only construction of the building, not fit-out or staffing).

The systematic archival review of historical and recent photographs of the property (including

satellite imagery) should begin to help document the state of conservation of the property since the beginning of the colonial period until the present day.

5.4 LONG-TERM ACTION (5-10 years after State Party receives this report)

Achievement of these 5-10 year goals will constitute the Desired State of Conservation, which should allow the property to be removed from the List of World Heritage in Danger.

a) Conservation Actions

Major stonework stabilisation should be well-advanced at Nandowas (113), Nanmwoluhsei A-C seawalls (119), Pahnwi A Islet (9) and the Peinkitel platform (55).

Silt management should be started in key areas around Nandowas (113) and Peinkitel (55) platform and as required/feasible through major water access routes through the centre of the property (with archaeological and other specialist input/oversight as required, pending funding).

Vegetation management should continue at Nandowas (113), Peinkitel (55) and land and water access-routes, and should be extended as feasible to other major platforms.

b) Management Actions

Implementation of the Management Plan (including tourism plan) should be well-advanced, while the full functioning of Nan Madol Historic Preservation Trust should continue.

The Cultural Centre should be built, fitted-out and fully-functioning (pending funding that is currently being sought from the Japanese Government. The funding under consideration covers only construction of the building, not fit-out or staffing).

Capacity-building should continue in vegetation management and stonework stabilisation and should begin for silt management.

Systematic archival review of historical and recent photographs should continue.

5.5 CONTINUING FUTURE ACTION (10+ years, pending funding and capacity-development)

a) Conservation Activities

Continue/extend stonework stabilisation on Nandowas and other platforms listed above, and extend to other major platforms as feasible (with archaeological and other specialist input/oversight as required).

Continue/extend silt removal (with archaeological and other specialist input/oversight).

Continue/extend vegetation management on Nandowas and other platforms listed above, and main land and water access-ways, and extend to other major platforms as feasible (with archaeological and other specialist input/oversight as required).

Assess feasible options regarding the main Temwen causeway to improve water-flow around Temwen Island and through the Nan Madol canal system.

b) Management Activities

The full-functioning of Management Plan including tourism management should be continued.

The full functioning of Nan Madol Historic Preservation Trust should be continued.

The full-functioning of Cultural Centre should be continued (pending funding that is currently being sought from the Japanese Government. The funding under consideration covers only construction of the building, not fit-out or staffing).

5.6 MANAGEMENT REQUIREMENTS FOR THE CONSERVATION WORK

All operations on the property must be co-ordinated with the Nahnmwarki Madolenihmw to ensure that customary/traditional protocols are observed.

All recommendations recognise that any interventions must be reversible and that the actions undertaken and the timetable for their implementation will depend on funding.

Local people and companies should always be approached first to undertake the recommended work.

All operations require oversight by FSM heritage authorities to ensure that FSM heritage legislation and regulations are followed.

5.7 FUNDING REQUIREMENTS FOR THE CONSERVATION WORK

It would be ideal to run the below as a Pilot Scheme – this would identify and cost the long-term strategy and would also confirm how such a capacity building exercise would work in the circumstances of the traditional leadership. As recommended in the main body of this mission report, "Nandowas" is the jewel in the crown – it is also easiest to access by sea and the pedestrian route is established (although it needs upgrading). Therefore, by implementing the below suggested packages, the site would become more accessible and the State Party could commence their wish to increase tourist numbers safely to the property.

Sample packages could be as follows;

1. Vegetation
    - The survey of large tree life and other vegetation present on the islet of Nandowas; train a minimum of 6 local personnel in the survey, trimming and cutting down of large trees and other vegetation.
    - Remove the debris safely and permanently from site, identifying and cutting good timber into reusable planks of timber to recycle in the building of new bridges.
    - Identify and store the recycled timber close to where it will be used.

2. Stone Surveys

Once the vegetation is removed successfully the next stage should be to survey the stone structure:

- Employ a stone survey specialist to commence surveying and training a minimum of 6 local personnel in recording the stone structures of Nandowas in drawing form using either total station, laser scanning or Photogrammetry.
- Employ a stone materials specialist to work with this group in surveying the condition of all stone work, recording the various conditions present on all structures on Nandowas.
- Run a number of workshops to further train and capacity build the local trainees.

- Hold a public presentation of the process and skills being developed.

3. Canal Clearing

Simultaneous to the stone surveys, a group could commence trimming and cutting back the mangroves in their various stages of development, from sprouting mangroves in mud, silt and in low lying water to cutting well-established ones which are threatening the stability of the banks:

- Perhaps the leader of the vegetation programme could train a different number of 6 local people to concentrate on this work.
- Boats would need to be made available to do this work.
- Flat bottomed unmanned boats could be used to store the vegetation material taken from the selected canals.
- A method of removing, collecting, bringing to a suitable location on the island and permanently dealing with the debris would have to be agreed and implemented.

4. Engineering

The next package could be the improvement of the pedestrian route, securing and strengthening the walkways – removing the current bridges and building a number of the new proposed bridges.

- Appoint an experienced engineer to firstly design and draw the new improved walkway and necessary bridges.
- Work with and train a minimum of 6 local people in the concept and implementation of the proposed scheme.
- Oversee the work until satisfied that the local trained people under a supervisor can continue the work competently.
- Before leaving the island, the engineer could agree the routes and bridges to be improved under this phase of work.

5.7.1 Immediate Action

Clearing of smaller vegetation on Nandowas and trimming mangroves on main access routes can be carried out with the local personnel and resources currently available.

Clearing of large trees on Nandowas will need professional attention from a qualified and certified arborist and/or tree-surgeon, along with input from archaeological, stone conservation and engineering specialists as required and pending funding, to ensure that clearing does not do further damage to the property in the short, medium or long term. Input from the Nahnmwarki Madolenihmw and FSM heritage authorities will also be required to ensure that customary restrictions and FSM heritage legislation and regulations are observed.

The resources required for large-tree clearing on Nandowas will be significant because specialists would need to be involved during all or most of the process. Skilled local arborists operate in Pohnpei and should be approached first about their capacity to do this work.

Expatriate specialists should only be engaged if suitable local specialists are not available, or if additional expertise is required. Pending funding, it would be highly desirable for any such skilled personnel (local or expatriate) also to be tasked with strengthening in-country capabilities to ensure local people can continue such work in future.

Such capacity-strengthening would require additional resources for assistance from professional trainers either within or from outside FSM, both to be a trainer to the tree-clearing personal and to “train the trainers”. Note that any technical tree-clearing and/or training capabilities thus developed could be deployed on other projects (and not only those concerning heritage sites) elsewhere on Pohnpei and indeed throughout FSM.

At present there are two likely sources of funding for this immediate work, in addition to existing extremely limited local resources:

1. The US National Parks Service has existing cooperation programmes with FSM which could possibly be extended and/or expanded, for both financial and in-kind support, including training. The State Party should enquire about this prospect through the well-established existing channels.

2. A joint bid for funding from the US State Department through the Embassy in Kolonia, Pohnpei, is being jointly developed by the University of Guam and the US non-profit Cultural Site Research and Management Foundation (CSRM) to undertake various immediate and short-to-medium-term work at Nan Madol. The bid was discussed in detail with the Reactive Monitoring mission team and envisages a group of public- and private- sector collaborators, including the likes of the US Army Corps of Engineers.

As of 1 March 2018, this US Embassy bid had proceeded to the second stage of the selection process. This success does not guarantee funding, or funding of the entire amount proposed, even if the overall submission succeeds. There are several requirements to be met and the second-stage deadline was 28 March 2018. No further information was available when the present report was submitted.

5.7.2 Medium-term, long-term and continuing action

The US National Parks Service could also provide support for future action. If the bid for State Department funding succeeds, it should also assist with action beyond the immediate future. In addition, the State Party should investigate the following possibilities amongst others[3].

It would be extremely beneficial if funding could be secured quickly for a specialist grants coordinator with demonstrated experience in successful international funding applications, to manage all funding bids as well as coordinate relationships with archaeologists and heritage practitioners making their own applications for work at Nan Madol, such as those behind the State Department bid. At present, this sort of work falls primarily to Mr Kohler in the Historic Preservation Office of the FSM, amongst his many other responsibilities. Mr Kohler has very limited resources. Continued funding for an experienced person to whom he could delegate this work would dramatically improve the chances of attracting international funding to support the conservation of Nan Madol. If funding for a grants coordinator is not available, the original Management Plan canvasses the “appointment of a designated property manager trained in cultural resource management and strategies for risk preparedness, conservation and tourism as well as an ongoing maintenance and monitoring program”. The World Heritage Committee recommends this action. This person may also be able to play the role mentioned above.

It is advisable that funding for the short-, medium- and longer-term actions all be investigated in parallel. This is because many of the prospects for medium- and especially longer-term funding entail slow and often complex application processes which have long lead-times and require significant interest and input from the State Party. Applying for them at the same time as short-term funding is investigated means that immediate priorities can be addressed while longer-term funding applications are still in progress.

It is also advisable that several different prospects at each level of funding (i.e. short-, medium-, long-term) are all investigated in parallel, to maximise chances that at least one will succeed, thus allowing at least some work to proceed in each timeframe.

[3] This report does not specifically endorse any of these funding sources or any individuals associated with them.

UNESCO's Partnerships may be available to fund continuing assistance with grant applications, as well as for capacity-building and the like. Funds-in-Trust paid for the present Reactive Monitoring mission. The newly-created Marketplace for World Heritage may provide other avenues for support. Small Island Developing States are a priority, as are properties in danger. A partnership may be a good way to fund continuing assistance with other funding bids.

ICCROM may be able to provide technical and capacity-building training, including through the recently-established ICCROM-IUCN World Heritage Leadership programme.

World Heritage Institute of Training and Research-Asia and Pacific (WHITR-AP). In addition to Chinese Government support mentioned below, the WHITR-AP category 2 centre in Shanghai may be able to provide technical and capacity-building training.

University/museum research projects. Many academic institutions are already involved in work at Nan Madol with their own research budgets. When they seek permission from FSM heritage authorities to undertake their projects, the government of FSM could propose a condition that the project also provides a negotiated level of support in capacity building, research, contributions to the management (including tourism) plan and the like, based on the recommendations of this Reactive Monitoring mission.

The UN Development Program Global Environmental Finance (UNDP-GEF). The UNDP-GEF Unit partners with environmental funds to support countries with simultaneous eradication of poverty and significant reduction of inequalities and exclusion, by catalysing environmental finance for sustainable development. The programme is currently funding heritage work in Samoa and may well consider a similar programme in Pohnpei.

The United States Agency for International Development (USAID) currently supports FSM. The USAID programme for the FSM is coordinated in a decentralized manner by its office in Manila. USAID focuses on development assistance with an increased focus on addressing climate change which may be relevant to Nan Madol.

The Japan International Cooperation Agency (JICA) is the largest bilateral development agency operating in the Pacific. It supports infrastructure development, broadly defined. JICA has previously shown some interest in cultural heritage issues in the context of their infrastructure investments in other regions (e.g. the subway system in Istanbul). The Pacific programme of JICA is coordinated from their headquarters in Tokyo.

The World Bank (FSM is a member). The World Bank programme for the FSM focuses on poverty reduction, economic growth, gender and climate change, aspects of which may be relevant to Nan Madol. This programme is managed by the World Bank Regional Office for the Pacific, based in Sydney.

The Asian Development Bank (FSM is a member). The ADB makes use of the Pacific Approach, an operational framework for the Pacific which encompasses the country partnership strategy for FSM. ADB operations in FSM are aligned with priorities identified in the FSM Action Plan 2023. ADB's country operations business plan (COBP) 2016–2018 for FSM includes investments in sustainable tourism, with technical assistance that is focused on the preparation of tourism development projects amongst other matters. The ADB programme for the Pacific is managed from its Regional Office in Sydney.

The Pacific Region Infrastructure Facility (PRIF). The FSM is a beneficiary of the PRIF, which supports improved planning and development of infrastructure in the Pacific. It does not provide funding for projects but may offer other forms of support relevant to Nan Madol. The

ADB, Australia, EU/European Investment Bank, Japan, New Zealand and World Bank are members of PRIF, which has a Secretariat at the ADB Regional Office in Sydney.

The European Union has a regional office is Fiji which coordinates its assistance to Pacific Island countries. It is supported on economic and technical issues by the office of the **European Investment Bank** in Sydney.

The Government of France has already supported work on or associated with the property through its embassy in Manila. The *Fonds Pacifique* could be investigated as a source of additional funding.

The Government of Germany may provide support in addition to that which may be available through the World Heritage partnership programme. For example, the Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) has had some involvement in the Pacific. The German Archaeological Institute (DAI) also has a major interest in international cultural heritage and may have an interest in supporting work at Nan Madol owing to the historical connection between Germany and Micronesia.

The Government of Australia has major interests in the Pacific. The Australian Embassy in Pohnpei is currently offering Direct Aid Program (DAP) grants. The grants are for community-run projects in Palau, the Marshall Islands and the Federated States of Micronesia and are focused on addressing basic needs in the areas of health, education, gender equality and poverty reduction, aspects of which may be relevant to Nan Madol.

The Government of China, acting through various parties, is a major actor in development in the Pacific. The major focus of its activities has been on infrastructure, but bodies such as the recently-established Asian Infrastructure Investment Bank (AIIB) may have funding programmes relevant to Nan Madol.

The Sustainable Preservation Initiative (SPI), a US-based non-profit international NGO. The website states that "SPI creates economic stability by giving communities the tools to be self-reliant, leveraging their historic sites responsibly and freeing them to thrive". http://www.sustainablepreservation.org/

World Monuments Fund (WMF), a US-based international non-profit NGO. The website states that the "World Monuments Fund sponsors an ongoing programme for the conservation of cultural heritage worldwide. The World Monuments Watch aims to identify imperiled cultural heritage sites and direct financial and technical support for their preservation". https://www.wmf.org/

Global Heritage Fund (GHF), a US-based non-profit international NGO. The website states that GHF's mission "is to sustainably preserve the most significant and endangered cultural heritage sites in developing regions of the world". https://globalheritagefund.org/

Japanese philanthropic groups, for example the Sasakawa Peace Foundation. The website states that "the Sasakawa Peace Foundation addresses the diverse and complicated issues that human society is encountering in the 21st century". https://www.spf.org/e/

6. DESIRED STATE OF CONSERVATION FOR THE REMOVAL OF THE PROPERTY FROM THE LIST OF WORLD HERITAGE IN DANGER

As well as setting out Corrective Measures, the DSOCR has to clearly define a point to be reached when the property might come off the Danger list. This has to be capable of being measured.

The mission considered that, before Corrective Measures could be defined, there needs to be a much clearer idea of how conservation of the property will move forward, with augmented resources to reverse the danger that it now faces arising from a lack of conservation and on-going management. Therefore, given the range of unknowns at this stage, it is not yet possible to define a Desired State of Conservation to be reached.

It is clearly in the State Party's interest to define the DSOCR but this has to be helpful and realistic.

7. CONCLUSIONS AND RECOMMENDATIONS

The mission is of the view that if significant immediate actions are not undertaken much of this property could be lost within a very short period of time.

An outline staged Conservation Strategy is proposed but even this is challenging due to the enormity and the fast growing plant life within the structures and the canals. It encompasses immediate, medium-term (3-5 years) and longer-term (5-10 years) actions to rehabilitate key parts of the site, as well as a range of funding options to support the work.

Given the enormity of the task facing this property and as the mission was only able to suggest a broad outline of the necessary Conservation Strategy, it was not possible to define a clear Desired State of Conservation (DSOC) at this stage. It is recommended that further collaboration is needed with the State Party, and with appropriate experts, to more fully define the detailed stages of the Conservation Strategy following which it should be possible to clearly draft the DSOCR in a way that helps the State Party.

In conclusion the following are the recommendations of the Reactive Monitoring mission;

- The World Heritage Centre and ICOMOS should work with the State Party & Traditional Leadership to agree a full short, medium and long-term conservation strategy.
- Achievable packages of work should be designed and set.
- Potential funders, sponsors and partners need to be identified.
- International Experts that are acceptable to all parties must also be identified.
- An immediate and long-term capacity building programme should be agreed and initiated.
- Possible Governments that may help with funding and/or taking on certain goals should be identified.

NAN MADOL

Structural Study Report

Annex 1 of the Report on the World Heritage Centre / ICOMOS Reactive Monitoring Mission to Nan Madol: Ceremonial Centre of Eastern Micronesia (Federated States of Micronesia) (1503)

ICOMOS
international council on monuments and sites

United Nations
Educational, Scientific and
Cultural Organization

World
Heritage
Convention

Contents

1 Introduction

This report provides a structural overview following the January 2018 joint UNESCO World Heritage Centre/ICOMOS Reactive Monitoring mission to Nan Madol, Pohnpei, Federated States of Micronesia. The report is to be read in conjunction with all associated Reactive Monitoring mission reports.

The Structural Study Report focuses on the structural integrity of Nan Madol; the modes of structural collapse; structural remedial measures and specific items that were observed to be requiring immediate structural review.

The findings of this report are based on a limited sample survey of the site and should not be considered as a comprehensive condition survey.

The mission was conducted by the following during a 10 day period.

- Ms Sachiko HARAGUCHI, Coordinator, World Heritage Programme for SIDS, UNESCO World Heritage Centre (Paris)
- Dr Ian Ashley LILLEY, ICOMOS (Archaeologist)
- Dr Peter COX, ICOMOS (Stone expert)
- Mr Charlie BENSON, ICOMOS (Structural Engineer)
- Dr Christophe SAND, ICOMOS Pasifika

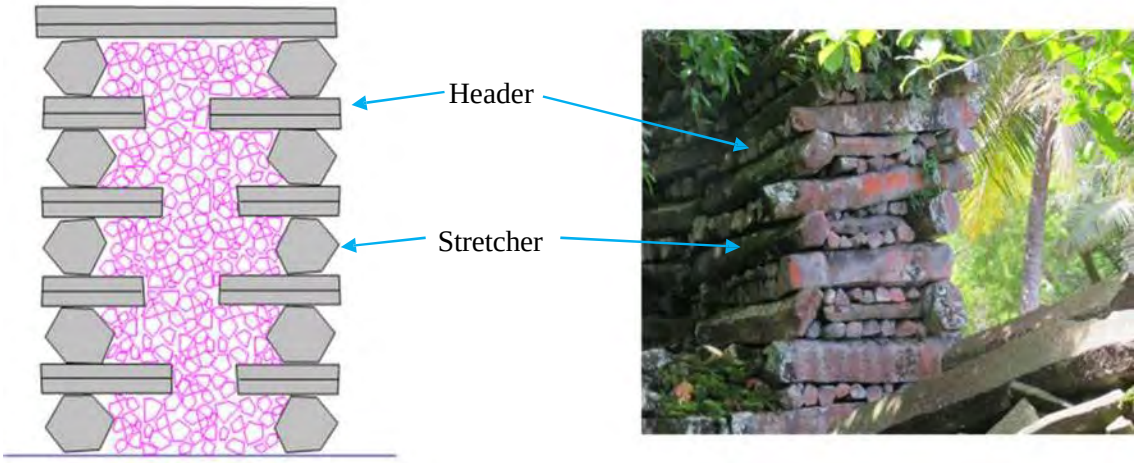
2 Structural Summary

The Nan Madol complex comprises a number of different structural forms that incorporate open joint stacking of natural formed basalt stone elements. The basalt elements are effectively 'loose fit' and rely on an interlocking assembly, friction and gravity to provide a structural integrity. The 'debonded' nature of the adjacent elements permits a degree of relative movement that accumulates to give the structures an inherent flexibility.

The structures can be categorised as, or combination of, the following 3 types:

2.1 Stacked Walls

The basalt stone elements are assembled as a series of horizontal header and stretcher courses. The header courses typically extend partially into the depth of the wall with coral packers providing the bulk infill between the outer faces of the wall.

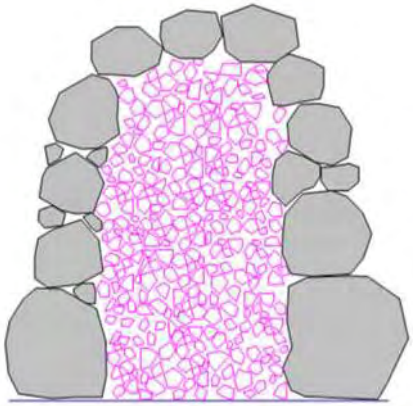


2.2 Islet Perimeter Retaining Walls

The basalt header and stretcher elements are stacked vertically or inclined back towards the formed islet. Coral infill stabilises the protruding header elements.

2.3 Mass Boulder Retaining Wall

Stacked boulders with graded stone/coral infill.



3 Structural Modes of Failure

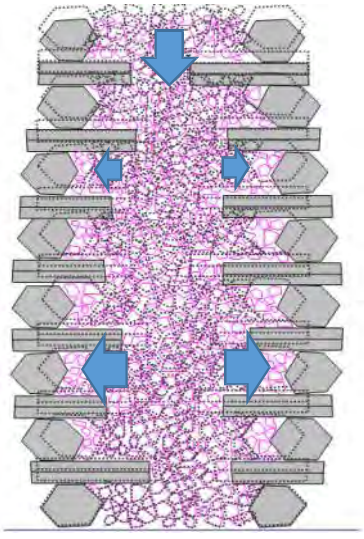
The extent of structural dilapidation across Nan Madol varies significantly. The following indicative modes of failure were identified individually, or in combination, during the sample survey of the site.

3.1 Self-Weight Compaction and Lateral Spreading

Unbonded elements settle over time under self-weight. The lateral thrust, due to the vertical stack's inclination to spread, can cause the wall to displace horizontally and destabilise.

The failure mode is predominantly at the lower levels so are difficult to fully rectify without dismantling and reconstructing.

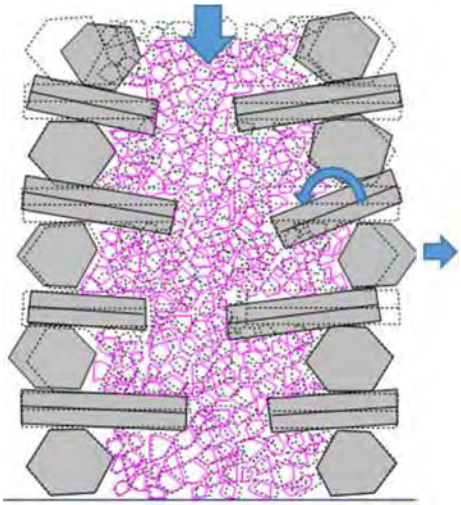
Remedial measures include external shoring to restrain further lateral movement and bespoke props to stabilise elements close to displacement failure.



3.2 Decomposition of the Coral Infill

Compaction, decomposition and weather erosion of the coral infill causes instability in the structure. The internal support for the basalt header elements within the wall effectively subsides causing rotation and displacement of the structural elements.

Maximum rotation is dependent on the length of the header and tends to occur in the upper levels where the differential depth of compaction is greatest. In such cases partial rectification could be achieved by dismantling and reconstructing the upper courses.

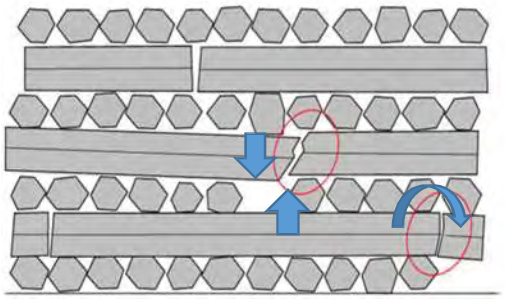


3.3 Brittle Fracture of the Basalt Elements

The basalt stretchers have a partial capacity to accommodate an uneven bearing/ loading before failure. Shear failure is due to localised point reactions whilst tension failure is due to localised bending stresses. Both cause fracture and the risk of displacement of the structure.

Fracture is spontaneous with minimal visual warning beyond the compromised alignment of elements leading to the brittle failure.

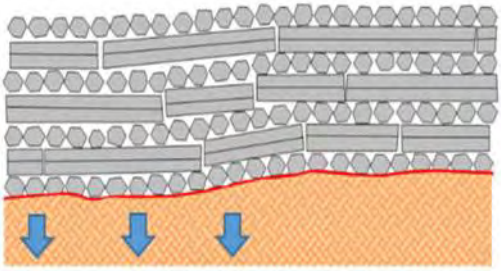
Discrete props can provide specific replacement support. Metal threaded pins can also be anchored to the stone to provide strengthening and to limit displacement for critical elements that are at risk of propagating progressive collapse.



3.4 Differential Settlement

Differential settlement of the foundations will propagate through the structure to cause relative displacements.

A number of techniques can be used to limit future ground movement including underpinning and injection grouting of the foundation strata.



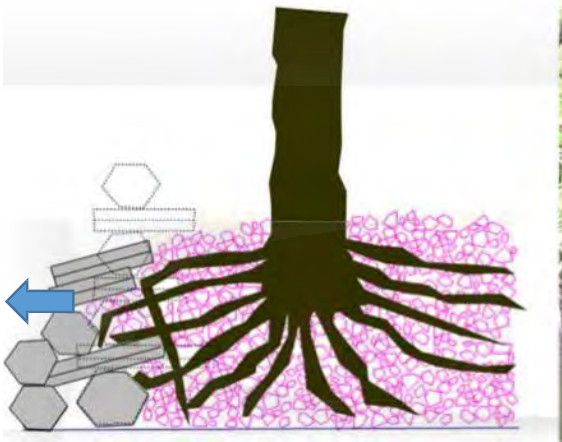
3.5 Vegetation

Vegetation/tree growth causes significant damage through a series of mechanisms including:

- Adjacent vegetation
- Embedded vegetation
- Collapsed vegetation

3.5.1 Adjacent Vegetation

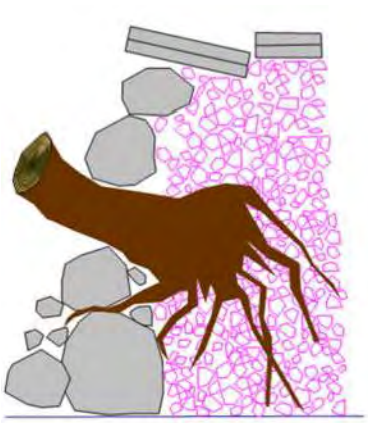
Growth adjacent to the structure causing ground heave and displacement. Removal of the vegetation will arrest the ongoing ground movement. Consideration is required to assess the effects of the decaying root system that may result in further detrimental movement as the stress in the ground dissipates.



3.5.2 Embedded Vegetation

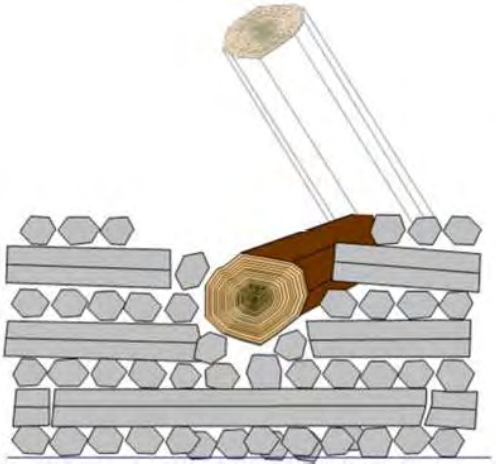
Growth propagating from vegetation (creepers/mangrove/trees etc) within the structure causing rupture and displacement of the structure. Weakness is also created within the structure as the vegetation decays and creates cavity voids. Trees and large growth can cause an abrupt collapse as the embedded trunk and roots rotate within the structure as they topple over.

Vegetation can provide critical support within the ruptured structure which in turn increases risks associated with its removal. Techniques such as confined injection grouting can provide the necessary substitute strengthening to mitigate the void generated by the removal.



3.5.3 Collapsed Vegetation

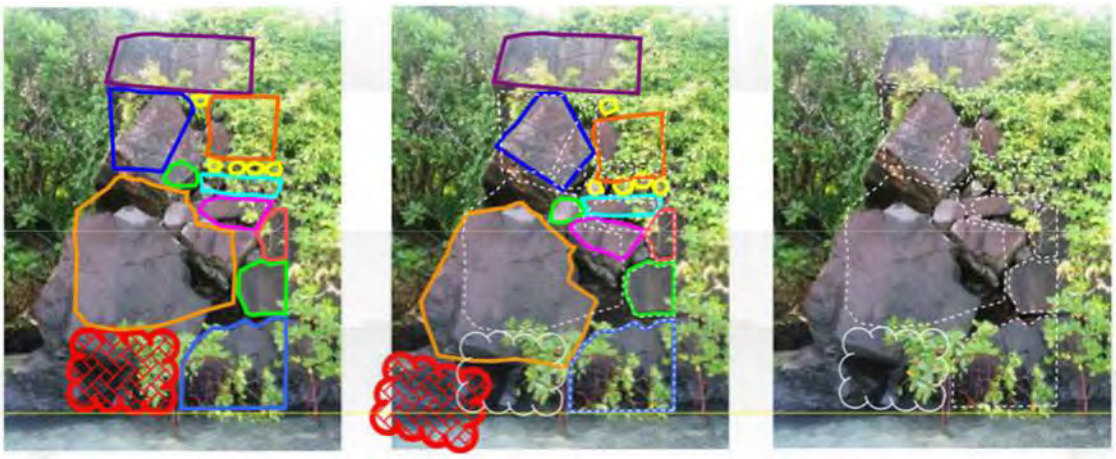
Impact from falling trees weakening and demolishing the structures. Controlled removal of vulnerable risk trees/branches would mitigate the risk associate with impact damage.



3.6 Subsidence

Failure of the foundation strata due to undermining or compaction resulting in collapse of the load bearing structure above.
Full rectification would require dismantling and reconstructing. Strengthening of the existing condition could be achieved by:

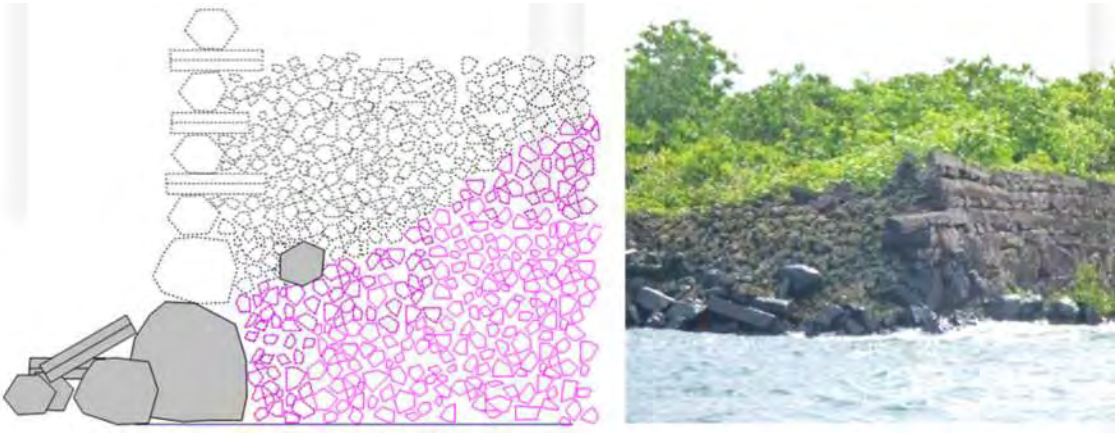
- external shoring
- bespoke propping
- grout packing
- foundation encasement
- protection from wave impact



3.7 Wave Action

Progressive or extreme (hurricane) coastal wave impact. The mode of collapse typically forms a relatively stable inclined embankment that has an inherent robustness to resisting further wave action.

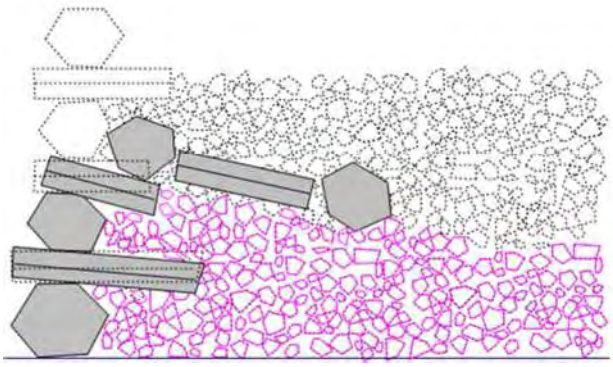
Reconstruction of the retaining wall could be achieved with minimal impact to the preserve original structure by use of a membrane or defining barrier to demark between the existing and new construction.



3.8 Tidal Erosion of Coral Fill

Erosion due to tidal flow action causing reduction of the internal bulk fill and collapse of structures.

Reconstruction of the perimeter wall could be achieved using replacement fill to provide a stabilising backing.

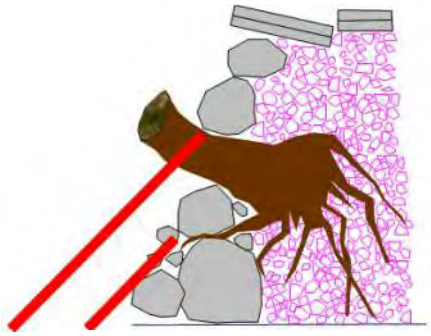


4 Remedial Options

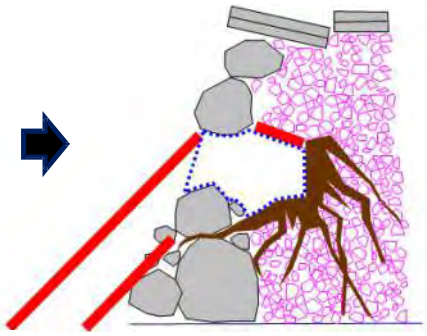
The following provides examples of remedial measures that could be implemented to mitigate further dilapidation of the structures.

4.1 Removal of Trees/Branches in Danger of Toppling onto Structures

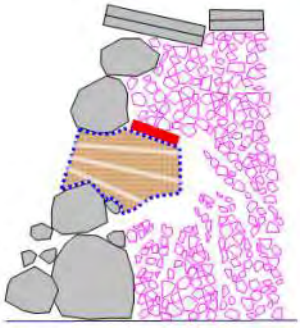
4.2 Removal of Embedded Vegetation (Complex Option)



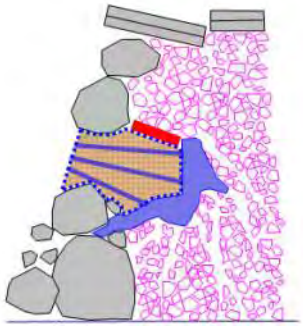
1) Stabilise structure with temporary supports



2) Remove tree shore infill and insert void grout bag

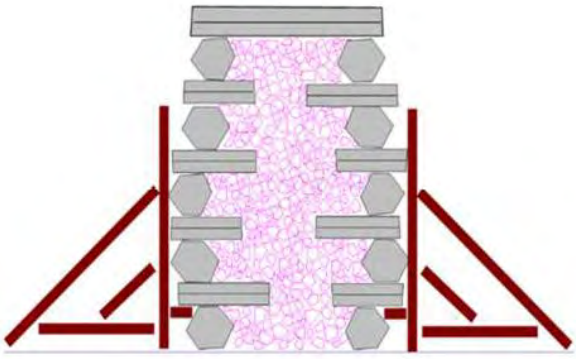


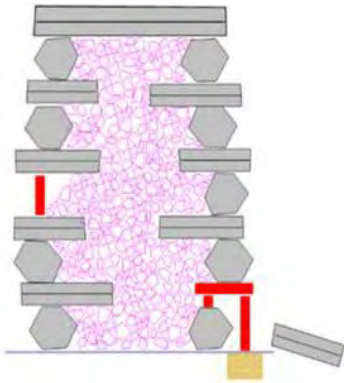
3) Fill grout bag and insert future grout tubes and de-prop temporary supports



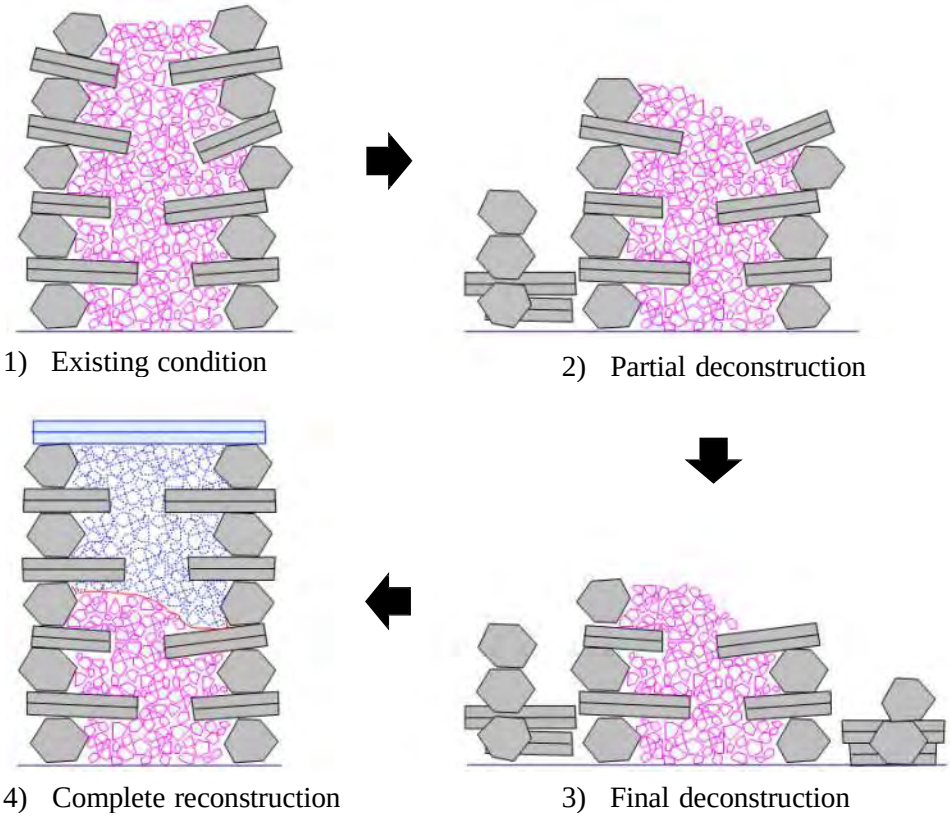
4) After progressive root decay grout resultant void

4.3 External Shoring and Propping





4.4 Deconstruction (Partial) and Reconstruction



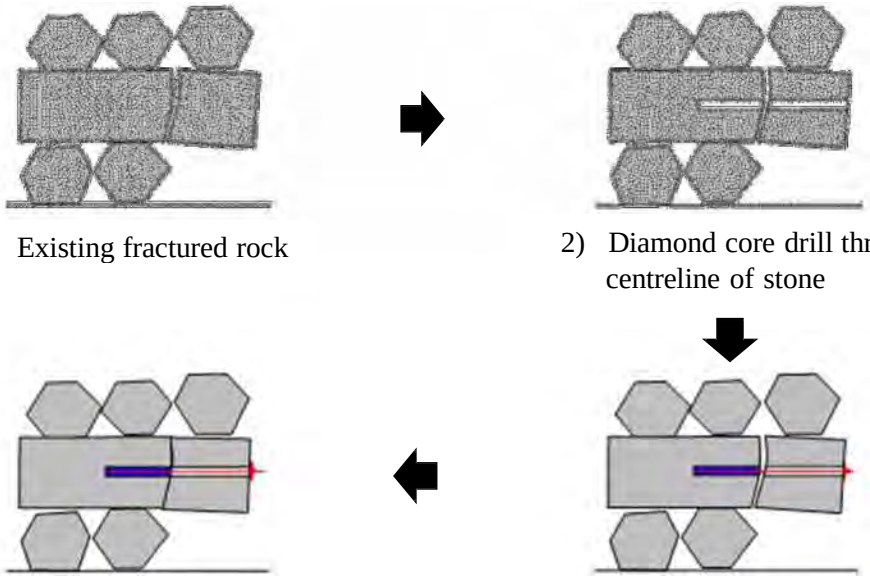
1) Existing condition

2) Partial deconstruction

3) Final deconstruction

4) Complete reconstruction

4.5 Pin/Mechanical Fixing



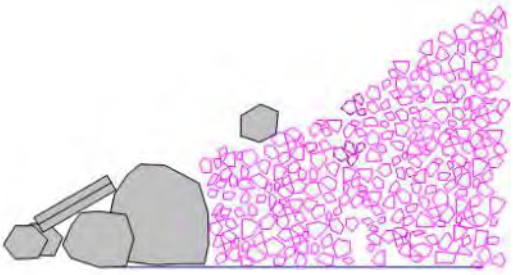
1) Existing fractured rock

2) Diamond core drill through centreline of stone

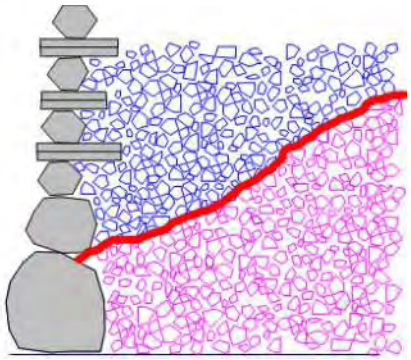
3) Grout threaded bolt into anchor stone and place washer and bolt to exposed end

4) Tighten bolt to re-align fractured stone

4.6 Reconstruction of Sea Wall



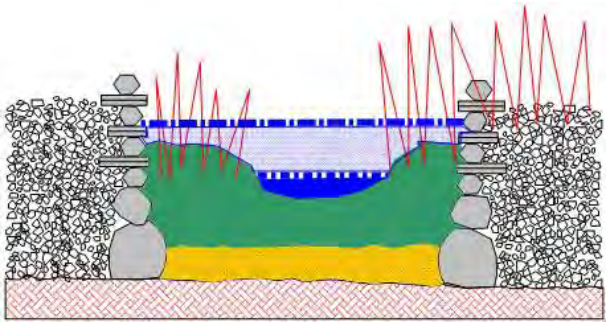
Existing condition



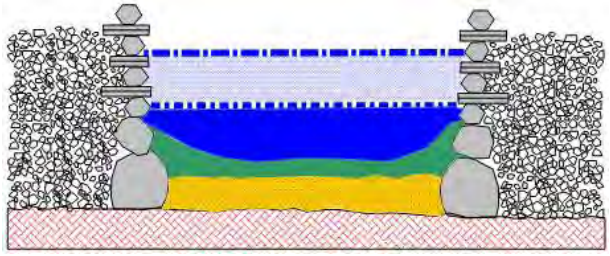
Reconstruction

To reinstate sea defences and restrict internal bulk fill erosion

4.7 Dredging of Tidal Channels



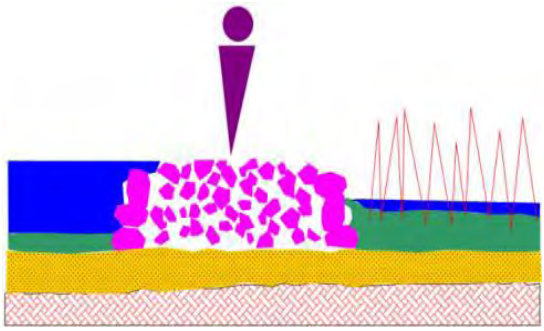
Existing silt propagating mangrove growth



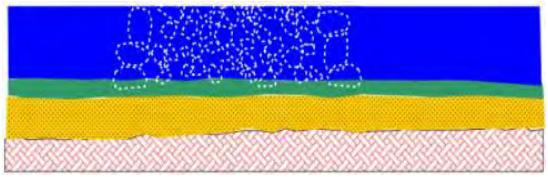
Dredge soft silt and remove vegetation

To reduce propagation of mangrove/vegetation growth

4.8 Removal of Causeway Walkways



Existing walkway blocking tidal flow

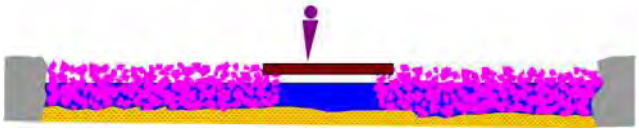


Tidal flow enabling self clearing silt

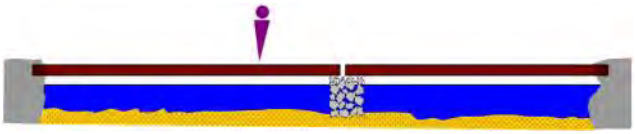
To improve tidal flow and reduce silting

4.9

4.10 Increase Bridge Spans between Islets



Existing short span bridge and solid causeway



Replace solid causeway with bridging and intermediate gabion piers

To improve tidal flow and reducing silting.
Gabions provide removable discrete bridge piers with minimal impact to the existing sub-base.

5 Recommendation for Immediate Action

During the sample survey of the Nam Madol the following locations were identified for further inspection to appraise current stability with respect to potential imminent collapse.

5.1 Nandowas

Collapsing Trees

5.2 Pahnwi Islet – South Corner

Instability, subsidence and sea erosion

5.3 Pahnwi Islet – South West Corner

Embedded tree, toppling and rupture

5.4 Nandowas Sea Wall – East Corner

Fracture and instability

5.5 Nandowas – North East Lower Corner

Verification of remedial infill

5.6 Nandowas – North East Upper Corner

Fracture and instability

6 Recommendation for Historic Survey

A systematic review of all archive photos with current survey photos will assist in providing a time history of recent dilapidation and help identify structures that are currently susceptible to movement.

Example: 1963 – 2018 showing similar status of Nandowas north west entrance collapse

Nan Madol

Stone Conservation Report

Annex 2 of the Report on the World Heritage Centre / ICOMOS Reactive Monitoring Mission to Nan Madol: Ceremonial Centre of Eastern Micronesia (Federated States of Micronesia) (1503)

ICOMOS
international council on monuments and sites

United Nations
Educational, Scientific and
Cultural Organization

World
Heritage
Convention

TABLE OF CONTENTS

1 INTRODUCTION

This report comments on the materials used and the condition of the structures and makes certain recommendations on the conservation of Nan Madol – and also includes a series of methodologies to address short, medium and long term conservation and stabilisation interventions to secure the structures and property.

The conservation strategies are based and should always adhere to "Best Conservation Practice" and in particular the ICOMOS "Venice and Burra Charters".

1.1 Background

The property is well-described in many documents and in particular the nomination file submitted to the World Heritage Centre for the inscription of the property on the World Heritage List (the property was inscribed in 2016 but was simultaneously inscribed on the List of World Heritage in Danger".

The series of 96 islets, all constructed with the natural resources available, and the City Nan Madol (was created in the 13th century and was believed to be ruled by Saudeleurs for 5 centuries and finally overthrown by the Isokelekel, who set himself up as the first paramount chief, or Nahnmwarki, and established the form of traditional leadership that persists today.

The structures remain a mystery to experts even today, as they use incredibly large pieces of Basalt ranging from 2 tons to 40+ tons for individual stones or rocks. In one instance, three rocks are placed on top of each other – each rock must weigh in access of 30 tons and stretch to a height of some 20 metres. That this was achieved in the 13th century, without any of the lifting equipment available today, is truly astonishing.

1.2 Capacity Building

The available trades, knowledge and traditional skills are not obvious on the islands and resources seem also to be extremely limited. There is a need to propose a detailed and comprehensive training and education course so that certain leaders on the island can then pass this training and knowledge on to carefully selected and suitable local inhabitants.

The range of skills suggested are;

- Tree surgery or Arborist
- Stone Masonry
- Carpentry
- Masonry Conservation
- Health & Safety
- Recording & Monitoring

1.3 Materials

The primary material used in the unusual and stunning structures that make up Nan Madol is of large elements of basalt with an infill or secondary material using coral – both of these materials are in abundance on the islands of the Federated States of Micronesia.

1.3.1 Basalt

a) Basalt is a dense fine-grained volcanic rock that is of a very dark colour, green or black. It is of basic composition and high specific gravity, representing the extrusive or volcanic equivalent of the plutonic gabbros. These rocks are formed under quick cooling near surface eruptive conditions. Their fabric is so fine that the constituent grains cannot be perceived by the eye nor with a lens, or if seen, are too small to be recognised, and which

are of a stony but not glassy texture. They commonly show cellular voids formed of contained gases which were emitted during the cooling process.

Basalt occurs in “flows” or beds of great extent and variable thickness, forming characteristic plateau and terraced hills. It can also be found in dykes which represent, in many cases, the fissures through which the molten lava welled out. The fact that in these vast plateaus there is no thickening towards particular centres from whence eruption might have been supposed to take place, and no accumulation of pyroclastic material present, leads to the common theory of the “Fissure Eruption”.

Tholeiitic basalt is relatively rich in silica and poor in sodium. Included in this category are most basalts of the ocean floor and most large oceanic islands.

Large masses of lava must cool slowly to form the Polygonal joint pattern that are seen at Nan Madol and at the quarries visited on Nan Madol. The large rock type units seen were quickly cooled. Basalt, and in particular the basalt found in the construction at Nan Madol, is a very hard wearing and homogeneous rock as can be seen by the little weather-related degradation on-site.

b) Source

The 2018 Reactive Monitoring mission team visited one quarry on Pohnpei, and samples viewed under a field microscope confirm that the stone on Nan Madol did not come from this source – the quarry itself shows evidence of it being on the periphery of the major volcanic action as the polygonal columns are at a 30 to 45° angle and are much smaller than the elements within the main structures. However, that said, it is possible that stones were extracted from several sites to achieve the pure volumes that have been used.

1.3.2 Coral

a) Coral is a living material found in reefs around the world, and although it only covers0.01% of the world’s surface, it accounts for 25% of animal sea life. Coral reefs are diverse underwater ecosystems held together by calcium carbonate structures secreted by the coral.

The bulk of coral reefs are made up of coral skeletons from mostly intact coral colonies – as other chemical elements present in the coral become incorporated into the calcium carbonate deposits, elements detach and sea surges and storms deliver separated coral to the shore.

b) Source

It is presumed that the coral was harvested from the very large coral reef that surrounds most of the islands in this region.

1.4 Structures

Many of the structures are now covered with heavy overgrowth of trees, mangroves, ivy and other biological material making many of the structures extremely difficult to fully assess from a condition point of view. However, with the great support of the FSM, HBO, Nahnmwarki and others, access to many of the important standing remains was achieved during this short mission and a reasonable understanding of the structures, the conditions prevailing, as well as the threats and the substantial challenges to creating a short, medium and long term viable and sustainable conservation strategy, has been advanced.

1.4.1 Access to the property

The property, as a whole, has two main access routes, one by foot and one by boat – sadly many of the water channels are now blocked to boat access by the aggressive growth of mangroves,

coconut trees and other biological matter, which is also having a secondary negativity by encouraging the build-up of silt, which then accelerates the growth of much biological matter.

1.4.2 Conditions of the Structures

a) Nan Douwas

The team concentrated on the “Gem” of the property – Nan Douwas - as this must be the first site that should be given special attention. The mission approached this site by both and sea and consider that the approach from the sea is preferable and special. It is suggested that this approach is encouraged in the proposed “Cultural Tourism Plan”.

b) Landing Point

The landing point is uneven and difficult for people not fully ambient to either enter by foot or by sea – this can easily be fixed by better placing the existing stones.

c) Trees / Biological Growth

Trees

Trees and other biological growth are by far the greatest threat to all elements of Nan Madol and in particular Nan Douwas. Large trees and their roots have been allowed to grow for many years, or even decades. In at least a couple of situations trees have grown, but while the branches have been cut off, the trunk has not been killed off – new growth is very evident on the larger older trunk. Trees can have a number of threats to stone structures: their roots can grow through voids in the stonework, and as they grow in diameter they exert pressure and can, as seen in many cases at Nan Madol, cause stone collapse. Large trees, such as coconut and bread fruit trees can cause stone collapse if they fall in high winds or extreme weather events. Trees and all biological growth retain moisture and can cause moisture-related damage to the stone structures, the ground, and the tombs, and this moisture can in turn encourage more growth of sapling mangroves.

All biological growth in its natural state of seasonal transformation drop leaves, branches and other debris that turn into soil and will affect any such monument over time.

Ivy

Ivy is predominant in some areas of Nan Douwas and, if allowed to develop over time, this can also dislodge or destabilise stones on the monument.

Ferns

Ferns are also evident and, although these are in their infancy, the roots can grow quickly and aggressively in voids.

Lichens and Mosses

There is an extremely interesting pattern of lichens and mosses in varying colours and patterns. It is not thought that any of those seenthreatento the condition of the stonework.

d) Stone

The construction of the standing monuments is effectively of dry stone walling with an outer and inner leaf of large basalt rocks or columns, and the internal infill is loose coral – there are many voids and the top haunching has long disintegrated. This allows moisture and biological debris - saplings and other types of growth – to prosper and cause damage to the structures over time.

Basalt

Basalt is an extremely hard stone and the basalt used on the property is of very good quality. There is little if no sign of surface degradation or surface loss with the exemption of very few stones which obviously had many inclusions when formed - over time these inclusions have lost their integrity and fallen or totally dissolved. In no circumstances is this a concern as firstly there are very few stones with this condition and the stones are of such a size and the surface loss so small it will not compromise the stone elements.

Cracking

Some cracking of major stones was noticed in several locations due to movement and a change in stresses on the individual stones – some of these cracks have also been caused by tree root growth. These need to be noted, recorded and monitored.

Shattered Stone

Remarkably few shattered stones were seen. Shattered stones are mainly caused by the compressive strength of the stone and the flexibility of the construction, but in a few cases impact by trees falling has caused such force as to shatter stones.

Stone Displacement

A few stones have been moved or slightly displaced by the growth of trees and tree roots. If the cause of this condition is rectified by removal of the offending matter, the stones should be noted, recorded and monitored.

Stone Collapse

Stone collapse is by far the most common condition found on Nan Madol and without fail all such collapses have been caused by fallen trees, large tree growth or damage by large tree roots beside and within the actual structures.

Stone Movement

There are two major areas of concern, namely Pahnwi (number 9) and Lukopkariahn/Kariahn (numbers 121 and 122). These are two important corners of the structures and are made up of very large stones piled on top of each other – the individual stones are estimated to weigh in the region of 60+ tons each. In the case of Pahnwi, there are now voids where wave action has caused movement or loss of material. Close to these stones, there is also a very large tree growing within the wall structure. Lukopkariahn is perhaps more concerning as it is more exposed and in a more precarious condition. This is covered in in more detail in the structural study report included as annex 1 of this Reactive Monitoring mission report.

Stone Sea Wall Protection

It is clear that the outer sea wall has suffered from 800 years of sea action and most likely extreme weather events such as typhoons, hurricanes etc. Despite this, the wall is certainly enduring but most of it is difficult to assess as it is well covered by advanced mangrove tree growth. Indeed, the mangroves are a new and fine protection against sea surges, large wave action and possible extreme weather events.

Pedestrian Route

By and large, the pedestrian route has been added in later years and, in some cases, islets have been extended to create these routes. The routes are fabricated by using some of the column stones as an edging and the pathway is filled with a range of coral with necessary steps in basalt. In most cases, the walkways are fine although uneven – should many cultural tourists visit the property, the unevenness may become a problem for less ambient tourists.

Later Bridges

There are several bridges which have been added later in order to complete the pedestrian route from Peinkitoi (number 55) to Nan Douwas (number 113). These bridges have, perhaps, caused

most damage to the property – they have tended to close off the channels by only leaving a very small area for the water to move freely. This has caused the channels to silt up, resulting in the growth of lots of mangroves. The root structure of the mangroves has multiplied the extent of silt build up, which in turn has accelerated the growth of more mangroves.

e) Coral

Coral has mainly been used as the infill material between the outer and inner basalt structure of all the standing monuments on the islets. Coral, when harvested and used in construction, is basically a material with a high content of calcium carbonate when dissolved in water. As is the case in most of the standing structures, the dissolved calcium carbonate hardens into a natural lime type product and fuses some of the coral to each other. I In most cases, this is a positive effect, but as there are lots of large voids within the structure, it is not consolidating the infill as one might hope.

In a few cases where movement or slight condensing of the infill material has occurred, this has resulted in a slight collapse of some of the cross members of the basalt, which is having a negative impact on the stability of the structure.

In a few isolated situations, there are coral pieces acting as a brace for large basalt elements – this is not good in the long-term, or indeed the medium-term, as the coral has a far less compressive strength than basalt. I If these coral braces collapse, it could lead to large-scale collapse of structures.

f) Channels

In most cases, the channels are now mostly non-navigational due to the level of silt build up over the years. This has also given rise to an aggressive level of mangrove tree growth within and on the side of the channels. The silting up has had a further negative effect as free-flowing water can no longer run through the channel network, which simply adds to the problem.

1.5 Traditional Leadership

The complexity of the traditional leadership of Pohnpei is extraordinary and it is something that has to be fully understood prior to any work being proposed or carried out.

1.6 Proposed Work Programme

The property is vast, including some 90+ islets and probably over 120 structures of varying size and state of conservation. The plant and tree life that is evident over the property is extraordinarily large and diverse, while the once well-thought-out channel network is now more or less dysfunctional. Therefore, tackling the property as a whole is impossible, impractical and nonsensical due to this and many reasons: the sheer manpower required to do so is not available; the financial commitment is not available; and the subsequent maintenance of such a large property would be virtually impossible. With this in mind, threats and achievable goals should be set as a first phase of a multi-phase project. This property is almost on the same scale as Angkor Wat, a property has developed over more than 30 years.

The work should be broken down into phases and types of works. There is no reason why certain works could not start immediately, once funding has been allocated and the right people have been chosen and trained to carry out that work. A major risk would be to start work that cannot be completed within a given timeframe due to lack of funding.

Where large areas of structures have collapsed, it is not proposed that these be rebuilt but should be rather stabilised or consolidated. Stones at risk of slipping or moving should be carefully placed. Where there is movement or areas at risk of further collapse, these will be stabilised and/or consolidated in-situ, left safe and monitored on a regular basis.

The areas recommended for phase 1 is as follows:

- Nan Douwas;
- The channels highlighted on the attached map;

- Corner 1;
- Building 55;
- Pedestrian route;
- Preferred boating route.

The type of work can be categorised as follows:

- Removal of trees;
- Removal of other biological growth;
- Stone stabilisation;
- Stone placing;
- Clearing young mangroves;
- Removing branches of large mangroves;
- Removing the existing unsuitable pedestrian bridges;
- Building new bridges as per design suggestion;
- Upgrading the pedestrian pathways;
- Removing some silt from certain channels;
- Building or creating a pontoon where the boat presently leaves from;
- Rebuilding the landing point at Nan Douwas;
- Recording;
- Monitoring.

2 METHODOLOGY

The following is a detailed methodology for the proposed immediate works. It is a general specification rather than specific, and any work carried out on-site should follow these procedures and methods. All labour working on the property should be trained or upskilled to a competent level, and where specialist skills are required, this should be carried out by a qualified specialist (for example, tree surgery should be carried out by a tree surgeon or arborist). There should be a minimum of two stone masons trained to carry out all work to the stone elements.

2.1 Removal of Trees

All trees, large and small, should be removed from Nan Douwas.

2.1.1 Fencing off working sites

These sites are to be suitably fenced off for the duration of the work to prevent tourists from entering the sites.

Given the archaeological constraints of the property, posts must not be driven into the ground. If cordoning off is required, it should be free standing and weighted down with suitable blocks sitting on the surface.

Warning notices and restricted area notices shall be put in place and will be constantly checked and maintained by the contractor.

2.1.2 Access to Higher Areas by Abseiling

a) It is the responsibility of the appointed tree surgeon contractor to propose and provide access arrangements to facilitate safe tree removal works to higher areas of the monument (this will most likely be achieved by abseiling).
b) The contractor shall provide a brief method statement outlining proposed access arrangements as part of this tender, however the following guidelines should be observed.

c) All people with responsibilities for supervision of site set up work should be familiar with the proposed work and safety at work standards.
d) Should scaffolding be erected, it is to be designed so that all the specified work can be easily and safely carried out. All hoisting and access facilities are to be included. The scaffolding is to be erected and maintained in accordance with British Standard (BS) 5973 or BS 5974 or similar.
e) All proper ladders must be firmly fixed. The ladder access must extend 1m over the landing place.
f) The scaffold must be inspected and signed off before use. Further inspections should take place should any modification or alteration take place.
g) All scaffolding must comply with BS 11939 for steel components and BS 2485 for scaffold boards.
h) Strict security measures must be taken to prevent trespassing on scaffolding.

2.1.3 Felling and Removal of Trees

Felling is the only option within the Nan Douwas area and in locations where trees are within a 5-metre zone of standing structures. Where the risk of injury or damage is an issue, a risk assessment for the removal of the tree must be undertaken and must satisfy general standards.

2.1.4 Salvage of Timber

Any timber suitable for re-use across the property should be considered for re-use as walk ways, bridges and/or hand rails for bridges.

2.1.5 Safety

Unless otherwise stated, all work shall be carried out to a minimum of British Standard 3998 (2010) and AFAG (Arboriculture and Forestry Advisory Group[1]) guides currently applicable or similarly approved.

The contractor should familiarise themselves with regulations such as The Provision and Use of Work Equipment Regulations 1998 (PUWER), The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) and Working at Heights Regulations 2005 (WAHR).

2.2 Removal of Tree Roots from Walls

There are a number of areas where large tree trunks and roots have grown within the wall structures – where this has occurred, these need to be carefully removed and, where voids are left, these voids are to be filled with grout in a bag (as recommended in the structural study report). This is to ensure that the intervention is reversible and that the grout can be contained.

2.3 Removal of Biological Growth

There are a number of different biological growth species on the stone at Nan Douwas and around the property, including ivy, ferns, and young mangroves. All these are to be removed and it must be ensured that all roots are taken out and removed from site. Items of biological growth should not be removed from structures whilst still alive – the following methodology should be followed.

All sites are to be suitably fenced off for the duration of the work to prevent tourists from entering the sites.

Given the archaeological constraints of the property, posts must not be driven into the ground. If cordoning off is required, it should be free standing and weighted down with suitable blocks sitting on the surface.

[1] http://www.hse.gov.uk/treework/resources/publications.htm

Warning notices and restricted area notices shall be put in place and will be constantly checked and maintained by the contractor.

2.3.1 Area

All lower order plant life to the wall, such as ivy, ferns or other saplings, shall be first treated with a biocide and allowed to die back fully prior to any physical removal from the structures. This is to ensure that little or no damage is done to the remaining historic fabric. All due care is to be taken so as not to damage the remaining building fabric. Roloxide or similar kills all leafy growth, so due care must be taken not to allow the product to settle on the grass, ground or anywhere close to water.

2.3.2 Biocide of Leafy Growth

Leafy plant growth to both faces of the wall and the adjacent connecting walls shall be treated.

There are many suitable products available on the international market but equally there are some that are not at all suitable to Nan Madol. A product should be sourced and cleared prior to purchase.

2.3.3 Procedure

The procedure must not be carried out until the area is fenced off and animals and general public have no access to the treated plants.

Prior to application of the product all large growth should be carefully cut back.

Roloxid 10, or similar, suitably diluted should be applied to the source of the growth and left for at least 24-48 hours.

Once dead, the remaining plant life and root systems are to be carefully removed by hand.

All due care is to be taken not to damage the remaining historic fabric.

2.3.4 Storage

Products are to be stored tightly sealed in their original containers.

Products must not be allowed to freeze. Products must not be allowed to come in contact with other plants or water courses.

All products should be stored according to the manufacturer's instructions.

2.3.5 Safety

Operators should wear protective clothing to prevent product from coming in contact with the skin or eyes.

Fill empty containers with water before disposal. Procedures for disposal of containers should comply with all relevant government, local authority and any other relevant regulations.

2.4 Stone Stabilisation

The stone used at Nan Madol is a very good quality basalt, and the material has not deteriorated in any way from environmental or atmospheric weathering. The only deterioration is due to physical damage from trees falling on to the structures, large tree roots growing through the structures, and from differential settlement due to these changed physical conditions. The most serious situations are where large falls of the stones has occurred, and leaving stones insecure with a risk of further movement. Some individual stones are cracked where there has been some movement, but these cracks are clean and will not have a detrimental effect on the weathering.

2.4.1 Pinning

Where there has been a fair level of movement, and where large basalt stones are now not securely resting on each other, consideration should be given to packing the gaps with varying slivers of basalt that are deep enough to fill the ope and secure the upper stone. This pinning stone should be suitably forced into the gap to secure its purchase, but not so that it asserts too much pressure on the stone above. A qualified mason should be employed for this work. Work on pinning of stones should always work from the bottom of the structure to the top.

2.4.2 Stone Placing

In many cases around the property, many sections of the structures have collapsed or partly collapsed due to the reasons pointed out in section 3.0. Many of these stones are now balancing and in a precarious situation, and could become a risk to visiting public. It is not suggested that these sections should be rebuilt as this will take many years and huge resources, however, any loose or stones that are risk of falling should be carefully lifted and placed in a safer position. This may result in stones being taken down from a height and placed on the ground – in all cases, any stones removed or placed should always be placed within the structure and close to where they are at present.

2.4.3 Surveys

In order to identify such stones as alluded to above, a survey of the area should be carried out and such stones identified and careful consideration given to how the stones at risk are to be lifted, where they are to be placed for safe keeping, and how they are to be presented.

2.5 Mangroves

Mangroves are perhaps the biggest risk to these structures and to the presentation of the property, but some are also acting as a protection against the tidal surges and extreme weather events. It is suggested that all mangroves on the south facing front be left in-situ and monitored over time.

Mangroves are also the main reason the channels or canals have silted up and are now causing difficulty to move around the property. Some of the silting is also due to other reasons which will be covered in a separate section.

All young mangroves should be removed from as many canals as is possible – this will be an ongoing maintenance issue and must be implemented on a regular basis, probably twice a year.

All larger mangroves that are well established on the sides of the canals and that may have a root into the canal side wall should have all branches protruding over the side walls of the canals cut down and removed from the location.

2.5.1 Young Mangroves

All sprouting young mangroves are to be pulled from the canals, collected and disposed of safely and off site. This task is also going to be an ongoing maintenance issue as the larger mangroves will still seed and the silted canals are a prime breeding ground for the trees.

2.5.2 Larger Mangroves

As mentioned above, all large mangroves along the canal should have all branches protruding over the side walls of the canals cut down on a regular basis. This should manage growth and re-rooting as the branches bend over into the silt. This can be carried out effectively by a group of local youths using machetes, but the branches removed must not be left in the water or on the ground around it. Disposing of these is going to be a challenge and should be well considered prior to commencing work.

Where larger mangroves are to be fully removed, the roots must also be fully removed so that the tree cannot grow back.

All debris from both exercises above must be carefully and thoughtfully removed from the property.

2.6 Removal of Existing Bridges

The bridges that were inserted on the property are causing problems and a restraint of water movement, thus creating a silting of the canals. These are to be removed and new bridges constructed as per the structural study report and designs included as annex 1.

Where possible, re-cycled timber from large and suitable trees that is planned to be removed from site should be used in the new construction – equally the stone used in the existing bridge constructions should be reused in gabions to form the new proposed bridges.

2.7 Pedestrian Route

The existing pedestrian route is adequate although not well-maintained. If the number and profile of cultural tourists to the property increase, the walkways will have to be upgraded. Where the walkway has been built within the canal, consideration should be given to reordering this so as not to reduce the canal width.

There is enough material on-site to deal with most reordering, but where new material is required, careful consideration of what material is used should be given and all materials should be compatible.

2.8 Silt Removal

It is believed that the wholesale removal of silt would be impossible in the short or medium term, but consideration should be given to a trial area: one section of a canal should be identified and as much silt should be removed as is required for the safe and easy passage of a boat. This trial should also record the method used and the volume of silt removed – any silt removed must be removed from site and disposed of carefully and off site.

2.9 New Departure Facility by Sea

There is a proposal to build a new interpretive centre on land owned by the Nahnmwarki. This project is to be supported by the Japan government and it was suggested that it will be designed by a Japanese design team. Consultation with the World Heritage Centre and ICOMOS must be afforded during this process. The mission considers that the interpretive centre will take some time to be designed, funded and constructed. In the meantime, it is intended to bring cultural tourists by sea to Nan Madol from this location – which is the practice at present. There is an unsuitable boarding and disembarking facility at this location.

2.10 New Pontoon

It is recommended that a new and floating pontoon be considered for this location where cultural tourists can safely and easily board or disembark from a boat. There should be a suitable and permanent gangway to the pontoon with hand rails. The design for this new pontoon should take into consideration that there will be larger numbers of cultural tourists departing from this point when the proposed interpretive centre is built.

2.11 Landing Point at Nan Douwas

The landing point at Nan Douwas is not adequate for an increase in visitor numbers. The existing landing point was constructed in the recent past and has used some stones from the property. This should be studied and reconstructed with care and consideration but made into a safe landing point for visitors landing on Nan Douwas by sea.

2.12 Recording

In all cases, and no matter how low the intervention is deemed to be, all present conditions and all interventions should be fully recorded in writing and should also be accompanied by drawings and/or sketches, and dates of all interventions should be noted. These records should be kept in paper copy and electronically and, for security, should be kept in at least two locations.

2.13 Monitoring

Due to the complexity of this property, its poor condition, and that risk of further damage is high, a monitoring strategy should be designed, agreed and implemented. Areas of high vulnerability should be noted and these areas checked physically every three months – photographs should be taken and if the monitor feels there is some movement then measurements and sketches should be made. If movement persists over two periods of inspection, action should be planned.

PHOTOGRAPHS

Fig.1: Map of the property.

Fig.2: 1st group meeting on arrival in Pohnpei

Fig.3: Meeting with the governor

Fig.4: Meeting the Nahnmwarki to get his blessing

Fig.5: The mission team

Fig.6: The jungle-like situation in the property

Fig.7: Large tree close to wall structure

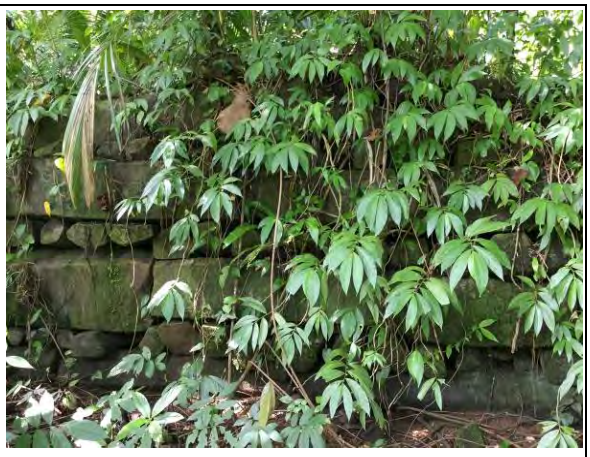


Fig.8: Large amount of biological growth on structures

Fig.9: Many forms of biological growth

Fig.10: Pathway at present

Fig 11: Pathway not easy to navigate

Fig 12: Pathway is very uneven

Fig 13: Cracked stone with section missing below – this will need propping

Fig 14: Cracked stone with no need to prop

Fig 15: Typical tree root system

Fig 16: A broken bridge

Fig 17: One of the bridges causing a restriction to water movement

Fig 18: Another one of the later bridges

Fig 19: Lukopkarian – a high-risk area

Fig 20: Pahnwi – A high-risk area

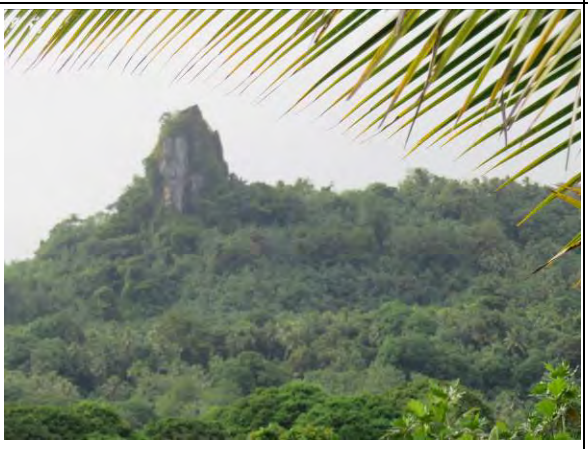
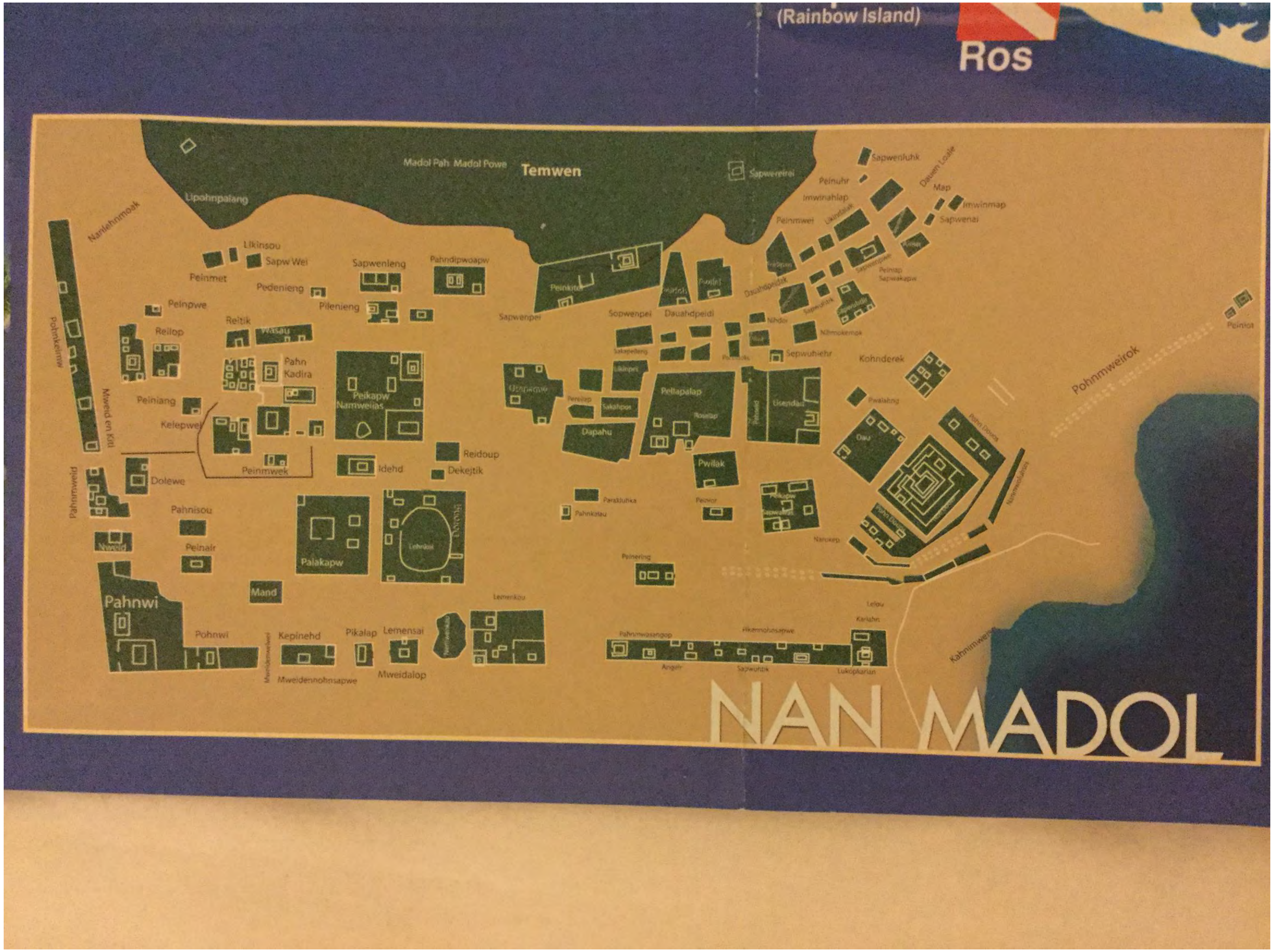


Fig 21: The original source of the stone

Fig 22: Close up of the remaining quarry



(Rainbow Island)
Ros
Temwen
Madol Pah Madol Powe
Lipohnpalang
Nanlehnmoak
Likinsou
Sapw Wei
Peinmet
Pedenieng
Sapwenleng
Pahndipwoapw
Pileniang
Peinpwe
Reitik
Wasau
Reilop
Pahn Kadira
Peikapw Namweias
Peiniang
Kelepwel
Peinmwek
Reidoup
Idehd
Dekejtik
Dolewe
Pahnisou
Peinair
Palakapw
Mand
Pahnwi
Pohnwi
Kepinehd
Pikalap
Lemensai
Mweidalop
Mweidennohnsapwe
Pahnmweid
Mweid en Kiti
Sapwenpei
Sopwenpei
Peinkitel
Dauahdpeidi
Sapwereirei
Peinuhr
Imwinahlap
Peinmwei
Sapwenluhk
Map
Imwinmap
Sapwenai
Sepwuhiehr
Kohnderek
Pellapalap
Dapahu
Pwilak
Pohnmweirok
Kahnimweiso
NAN MADOL

Figure 4 Plan view of the Nan Madol

Legend:

Secure Pedestrian Route

Clear Canals of Vegetation

1. Clear Nan Dawas of vegetation
2. Clear of vegetation
3. To monitor on regular basis
4. To monitor on regular basis

Preliminary archaeological study on the channels of Nan Madol (January 2018), as part of the assessment prior to the implementation of a dredging programme

Annex 3 of the Report on the World Heritage Centre / ICOMOS Reactive Monitoring Mission to Nan Madol: Ceremonial Centre of Eastern Micronesia (Federated States of Micronesia) (1503)

ICOMOS
international council on monuments and sites

United Nations
Educational, Scientific and
Cultural Organization

World
Heritage
Convention

Context

As part of the long-term conservation of the World Heritage property of Nan Madol: Ceremonial Centre of Eastern Micronesia (Federated States of Micronesia), the World Heritage Centre requested the improvement of access to the property by dredging some of the channels. These are today cloaked by sand and mud and invaded by mangrove trees, preventing navigation at low tide.

Aside from a study of old photographs to identify possible changes in the silting and in the tree cover (see Sand, January 2018), a preliminary archaeological study of some key locations of Nan Madol was fulfilled over 6 days between the end of January and the beginning of February 2018 by Christophe Sand, archaeologist, hired by the *National Archives, Culture, and Historic Preservation* (NACH) of the Federated States of Micronesia (FSM) to prepare a draft Conservation Plan for the property. He was assisted in the field by members of the *Historic Preservation Office* of Pohnpei State.

Objectives

The three main objectives of the study were:

- To gain information on the original depth of some of the channels and to determine the nature of their fill, especially to assess the possible presence of archaeological remains (question 1);
- To identify the depth of the basis of some of the platforms (question 2);
- To assess the hypothesis of significant recent erosion of sediments from Temwen Island into the property (question 3).

To address these questions, 5 cores were drilled in the channels and 7 test-pit excavations were opened around Nan Dawas, along the main channel, in the mangrove area and on land.

Main results

- Question 1. Three cores drilled in the mangrove area reached depths of 75cm, 130cm and 210cm respectively, the first two cores being halted by compact fill (stone and coral pebbles). The deepest core reached a sandy layer at -180cm. All the deep cores showed a fill with differentiated stratigraphic layers, mainly characterized by a clay/sand matrix. The test-pits opened in the channels the surface strata of which are mainly composed of sand deposits, showed a compact fill of stone/coral pebbles and shells. One excavation reached a depth of over 100cm, the stratigraphy being characterized by a fill exhibiting human-related remains. The lower sterile substratum was not reached. The density of the stone/coral pebbles in the excavated layers is variable between depths. The shells appear to be mainly refuse, thrown into the channels after consumption. Dog and fish bones, as well as a few cultural items (e.g. a shell adze fragment, a perforated shell bead, and a shell pendant) have been found in the fill, demonstrating that the channels are archaeological loci. Very few Western items have been found during screening of the sediments. The only excavation positioned in the area close to the open ocean has shown that the sand was probably deposited fairly recently, possibly as part of shifting dune movements.

- Question 2. Three test-pit excavations and one direct observation have allowed some insight to be obtained into the height of the walls' basis buried under the sand fill of some channels in the north-eastern half of the property. The basis of one of the outer walls protecting Nan Dawas (platform 110) was reached at 90cm below the mean low tide. This is consistent with the data published for an excavation fulfilled by archaeologist W. Ayres along the main outer wall of Pahnwi (platform 9). The test-pit along the southern retaining wall of platform 113 (Nan Dawas) reached 105cm below mean low tide, without reaching the bottom of the raised stone alignment. Along the main channel, the retaining wall of platform 104 reaches at least 95cm below mean low tide. Observation of the basis of the south-western wall of platform 129, built on the edge of the 'blue hole', show that the first blocks were disposed directly on the sand, at about 70cm below low tide. The bottom of the wall was not reached by the test-pit excavation. The lower 50cm bear coral growth on the outer edge of the stones.

- Question 3. A test-pit was positioned on land, near the north corner of platform 55 (Peinkitel), on the north-west side wall facing the talus slope of Temwen Island, in order to identify if a significant deposit of sediments had occurred over time, burying the lower tiers of the wall. The excavation revealed only 25cm of soil resting on the lowest stone. This lintel was placed on the original ground-floor. The conclusion that can be deducted from this test-pit is that no significant erosion fill was trapped by the inland wall of Pahnkitel, questioning the hypothesis of major recent silting of the Nan Madol channels from deposits originating on Tamwen. This is consistent with observations made on old photographs of the property, which do not show any major change in silt accumulation over the last half century.

Conclusion

Two main preliminary conclusions can be drawn from the 5 cores and 7 test-pits fulfilled in different locations of Nan Madol. The first is that the fills of the channels preserve archaeological remains and must therefore be considered as historical layers. The second is that the basis of the retaining walls along the channels filled with a sand matrix appear to be buried between 50cm and over 100cm under the low tide height. Coring results appear to indicate that some channels in the mangrove area forming the north-western side of Nan Madol have a deep fill, which might signal deeper wall basis. These conclusions from a 6-day field study will need to be confirmed and enhanced in the future by more extensive excavations.

Annex 4

TERMS OF REFERENCE

JOINT UNESCO WORLD HERITAGE CENTRE/ICOMOS

REACTIVE MONITORING MISSION/INTERNATIONAL ASSISTANCE MISSION TO

NAN MADOL: CEREMONIAL CENTRE OF EASTERN MICRONESIA, FEDERATED STATES OF MICRONESIA

16 – 24 January 2018

At its 40th session, at the time of inscription of the property on the World Heritage list, the World Heritage Committee requested the State Party of the Federal States of Micronesia to invite a joint World Heritage Centre (WHC) / ICOMOS Reactive Monitoring mission to Nan Madol World Heritage property (Decision 40 COM 8B.22, Annex I). The objective of the reactive monitoring mission is to 'agree on a Desired State of Conservation for the removal of the property from the List of World Heritage in Danger, based on the cultural attributes of Outstanding Universal Value and to be reached through a detailed assessment of the stability of the walls as a base for setting out a Conservation Strategy and corrective measures that can then be phased and costed. Efforts would then be made with the assistance of ICOMOS and UNESCO to find partners and donors to support this conservation project'.

Committee decision 41 7A.56 clarified that 'the mission will consider a draft Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR) and that this should aim to reflect both the long timeframe needed for the major project to stabilize the extensive stone remains, and the need to define a point at which the main threats have been mitigated to an acceptable degree before the overall project has been completed'.

This joint UNESCO World Heritage Centre/ICOMOS Reactive Monitoring Mission (RMM) will address the requests of the World Heritage Committee at the time of inscription of the property on the World Heritage List in 2016, and also work supported by an International assistance Request (IAR) approved in March 2017.

1. *Background:*

   Nan Madol was inscribed on the World Heritage List in 2016 (Decision 40 COM 8B.22, Annex 1) and at the same time on the World Heritage List in Danger (Decision 40 COM 8C.1) in recognition of the major long-term conservation challenges facing the property, particularly for the remains of stone palaces, temples, tombs and residential domains built between 1200 and 1500 CE and the overgrown and silted up waterways that connect these sites. At the time of inscription, the Committee recommended that 'the State Party invite a joint World Heritage Centre/ICOMOS Reactive Monitoring mission to the property in 2016 to agree on a Desired State of Conservation (DSOC) for the removal of the property from the List of World Heritage in Danger'.

Inscription on the List in Danger was supported by the State Party as a means of drawing in support for an overall assessment of the stability of the stone remains, for drafting a long term Conservation Strategy and for attracting international support for its implementation.

In 2016 the State Party requested support of $30,000 from International Assistance for drafting a Conservation Plan and for carrying out preliminary work on clearing the waterways. This request was approved in March 2017. Work on the waterways will be carried out in the second half of 2017, while the drafting of the Conservation Plan will be carried out following the RMM. The archaeologist who is to draft the Conservation Plan will be part of the RMM.

Meanwhile this expert has also produced an outline conservation survey of the stone remains funded by the French Embassy in the Philippines and undertaken with the assistance of the FSM Office of the National Archives, Culture, and Historic Preservation (NACH) in Pohnpei. This report will form part of the background papers for the RMM. Further work has also been undertaken by experts from Association for Promotion of International Cooperation (APIC) in Japan and the University of Guam, USA but so far reports of this work have not been made available to the World Heritage Centre or ICOMOS.

2. *Mission Experts*

The multi-disciplinary mission team will consists of an archaeologist, a stone expert, a structural engineer and a project management specialist, together with a staff member of the World Heritage Centre.

3. *Duration of Mission*

Ideally the mission should span 10 days with 5 days for on-site field work and 5 days for workshops and other consultations with stakeholders.

4. *Aim of the Mission*

The overall aim of the mission is to discuss and agree with the State Party the main parameters of the Conservation strategy and its projects, a defined project management approach for delivering the projects, a strategy for attracting international assistance, and the drafting of a DSOC and to discuss how on-going supports and these reports can be framed to set out Corrective Measures and the Conservation Strategy..

These individual elements are set out in more detail as follows:

a. *DSOC*

Advise on drafting of a DSOC, including Corrective Measures, for ultimate removal of the property from the World Heritage List in Danger.

Such a DSOC needs to be based on an assessment of the state of conservation of the property, a Conservation Strategy that sets out short, medium and long term projects to stabilise the stone remains and open up the clogged and silted waterways, and a defined project management approach for delivering the projects. (see below);

b. *Surveys and Documentation*
Consider the scope of existing surveys and documentation of the property and advise on future needs;

c. *Conservation*
Consider the overall state of conservation of stone remains and water channels and identify specific challenges facing the property including:

- Stone decay, water erosion
- Engineering problems related to scale of basalt pillars and coral blocks
- Need for supplies of new materials
- Damage caused by vegetation/need to control wave erosion
- Control of access;

d. *Conservation Strategy*
Consider the scope of a Conservation Strategy in terms of short, medium and long term projects to stabilises the stone remains and open up the clogged and silted waterways, based on a defined project management approach for delivering the projects (see below); the Strategy will also need to be framed in a way that allows its use as a tool for attracting international support (see below);

e. *Resources*
Consider the current resources available to the property for conservation, their structures, and identify how these could be strengthened and augmented to address conservation projects;

f. *Project Management Approach*
In the light of the remoteness of the property, the scale of the conservation problems and the currently limited resources, advise on appropriate project management structures in relation to contractors, local capacity building activities, human and financial resources necessary to create a framework for project delivery, and the possibility of international donor funding; specific attention should be paid to how a long term project could contribute significantly to local sustainable development;

g. *Strategy for International support*
Based on an agree approach to a Conservation strategy and Project Management Approach, advise on a strategy for attracting support from international donors;

5. *Mission Report*
The Mission experts are requested to write a report on these issues, on the basis of information gathered during the mission.

Based on the results of assessments and discussions with the State Party representatives and stakeholders, the mission will develop recommendations for the Government of the Federated States of Micronesia and the World Heritage Committee

with the objective of providing guidance to the State Party for actions to be taken to address identified threats to the components sites of the property, and to improve the conservation of its Outstanding Universal Value.

The mission will prepare a concise report on the findings and recommendations within six weeks following the site visits, following the World Heritage Centre Reactive Monitoring mission report format.

Annex 5

The Mission Team

- Dr Ian Ashley LILLEY, ICOMOS (Archaeologist)
- Mr Charlie BENSON, ICOMOS (Structural Engineer)
- Dr Peter COX, ICOMOS (Stone Conservator)
- Ms Sachiko HARAGUCHI, Coordinator, World Heritage Programme for SIDS, UNESCO World Heritage Centre (Paris)
- Dr Christophe SAND, ICOMOS (Archaeologist)

Annex 6

Mission Programme

for the WHC-ICOMOS Joint Reactive Monitoring Mission to Nan Madol, FSM
16-24 January 2018

(Mon) 15 January:
13:00 Arrival of the Mission members at Pohnpei airport

Day 1: (Tue) 16 January:
09:00-09:30 Courtesy call with Pohnpei State Governor

09:30-11:00 Meeting with the staff of HPO and other technical entities
- to hear the local practitioners of Nan Madol's preservation on conservation issues.

13:00-14:30 Meeting with the Director, Office of National Archives, Culture and Historic Preservation (NACH)

14:30-16:30 Visit to Quarry and Ridge in Sokehs

Day 2: (Wed) 17 January
09:00-10:00 Courtesy call on Nahnmwarki, Traditional leader of Madolenihmw

10:30-16:30 Site visit to Nan Madol by land
- Nan Dawas, the main structure and continue observations on the specific structure and its surroundings.

Day 3: (Thu) 18 January
10:00-17:30 Site visit to Nan Madol by boat (Upper & Lower parts of Nan Madol)

Day 4: (Fri) 19 January
10:00-12:30 Reflection meeting with the representatives of HPO and NACH

16:00-17:00 Meeting with the Japanese Ambassador to the FSM
16:00-17:30 Presentation of a proposed project on Nan Madol by the University of Guam

Day 5: (Sat) 20 January
09:00-15:30 Site visit to Nan Madol (Nan Dawas) by land

Day 6: (Sun) 21 January
08:30-10:00 Meeting with International Partners -harmonization of on-going projects

12:00-14:00 Lunch meeting –to discuss the way forward and recommendations

Day 7: (Mon) 22 January:
09:00-16:00 Site visit to Nan Madol by land (Peinkitek) and by boat (outer walls)

19:00 Reception

Day 8: (Tue) 23 January:

09:30-12:00 Meeting among the mission team
- to prepare some main conclusions to present to the Governor and stakeholders.

13:30-17:30 Preparation of the report

15:00 Departure of Charlie Benson from Pohnpei Airport

Day 9: (Wed) 24 January:

10:00-11:30 Visit to Chicken sit mountain quarry

12:00-13:30 Exit meeting with Governor and key stakeholders
- main outcomes and recommendations and the way forward

15:00-18:00 Visit of Pohnpei Island (Pohnpaip Petroglyphs, Kepirohi Waterfall, Nahnpei Memorial site)

(Thu) 25 January:

15:00 Departure of the Mission members (Sachiko Haraguchi, Ian LIlley and Peter Cox) from Pohnpei Airport

Annex 7

List of persons met during the Mission to the Federated States of Micronesia

(16-24 January 2018)

Pohnpei State Government

- Marcelo Peterson (Governor)
- Romeo Walter (Assistant to Director of the Department of Resource & Development)
- Mordain David (President, Historic Preservation Office)
- Jason Lebehn (Technician, Historic Preservation Office)
- Clara Halverson (Pohnpei Tourism Office)
- Shirley Ligohre (Coordinator, Governor's Office)

National Government

- Dr. Rufino Mauricio (Director, National Archives, Culture & Historic Preservation)

FSM National Commission for UNESCO

- Augustine Kohler (Secretary General)

Traditional Leadership

- Nahnmwarki (Paramount Chief)

Other stakeholders:

- Masao Silbanuz (landowner adjacent to site).

International partners

- Takuya Nagaoka (Executive Director, NGO Pasifika Renaissance)
- John A.Peterson (University of Guam, President, ICOMOS International Committee on Archaeological Heritage Management -ICAHM)
- Douglas Comer (President, ICOMOS US)
- Ryoichi Horie (Ambassador Extraordinary and Plenipotentiary, Embassy of Japan, Pohnpei)
- Koji Sugiyama (Counselor, Embassy of Japan)
- Koji Oda (Second Secretary, Embassy of Japan)
- Ratsuki Nakaya (Adviser/Researcher, Embassy of Japan)

Annex 8

Photographs

Meeting with the staff of HPO and other technical entities

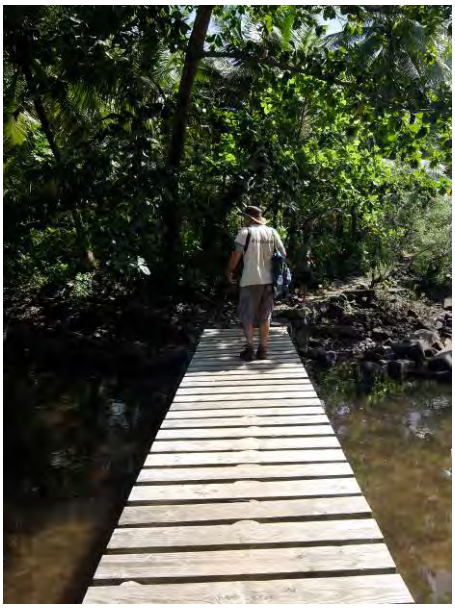
Courtesy call on Nahnmwarki, Traditional leader of Madolenihmw

Entry point by foot

Departure point by boat

Pathways and bridges to and around Nandowas (no.113)







Around navigable canals and sea

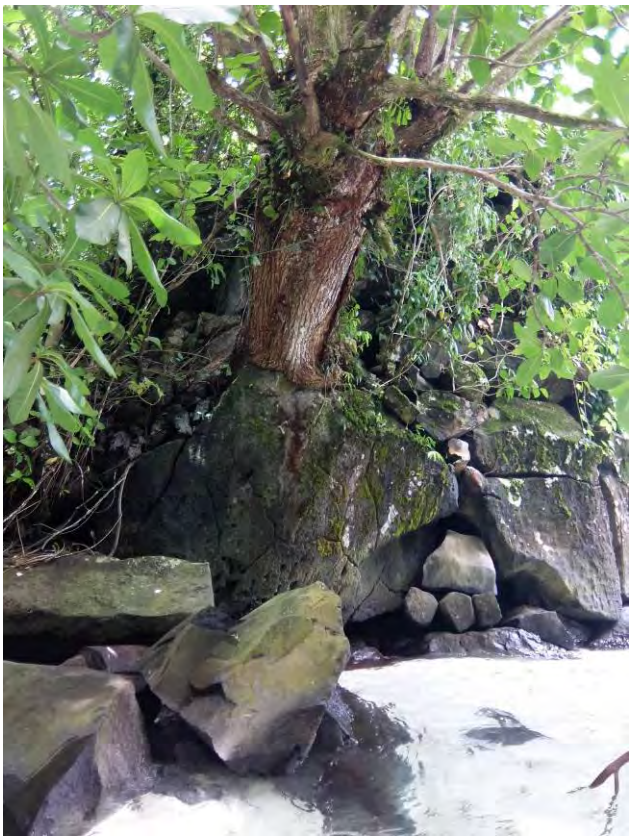
Progressive or extreme (hurricane) coastal wave impact

Nandowas (no.113)

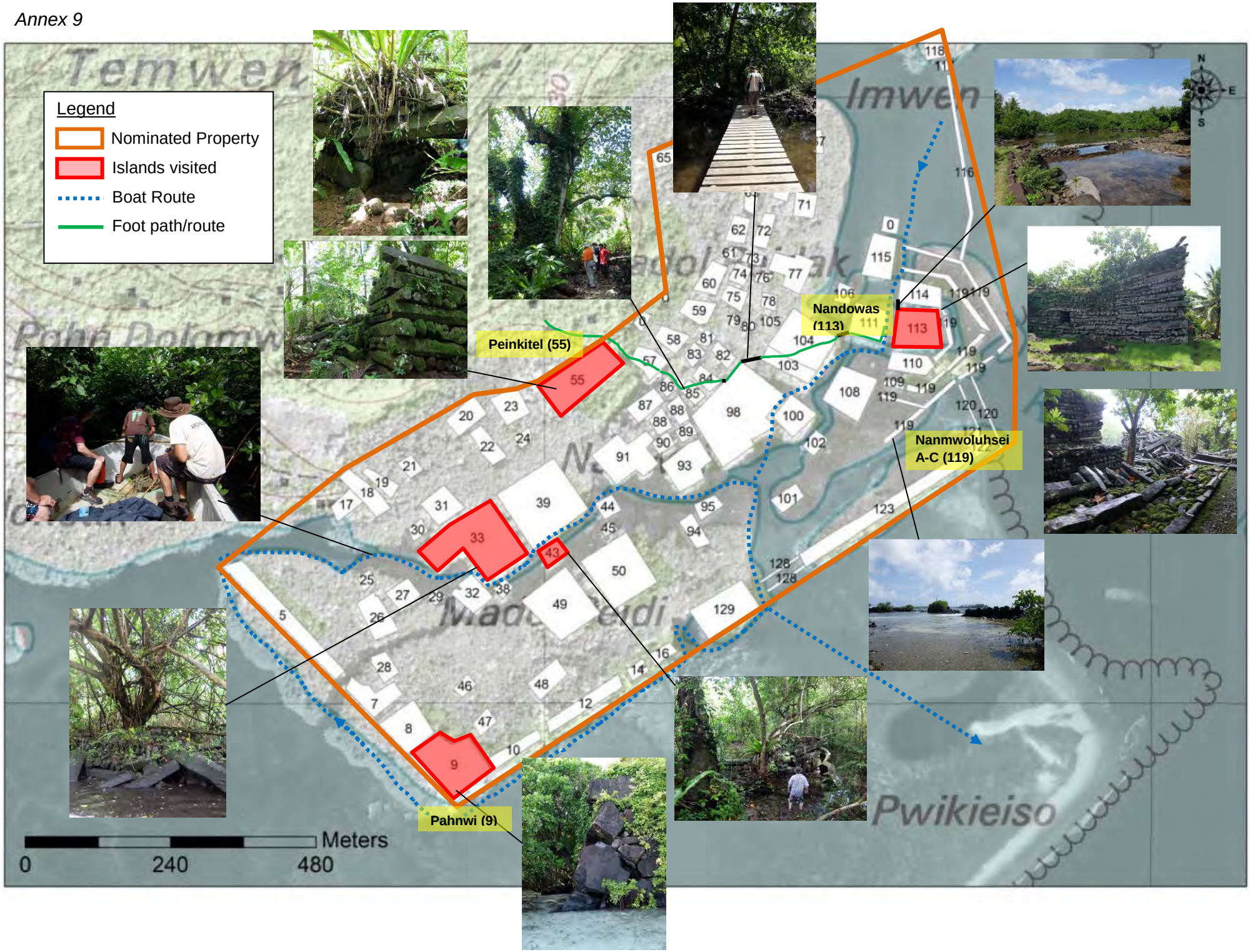
Cracked Stone with section missing below

Peinkitel (no.55)

Pahnwi (no.9)



Annex 9


Legend
Nominated Property
Islands visited
Boat Route
Foot path/route
Temwen
Imwen
Pwikieiso
Peinkitel (55)
Nandowas (113)
Nanmwoluhsei A-C (119)
Pahnwi (9)
Meters
0
240
480