Peleliu Archeological Survey 2014

WWII Battlefield Survey of Peleliu Island, Peleliu State, Republic of Palau

Final Report

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American Battlefield PROTECTION PROGRAM
National Park Service
"Working Together To Preserve America's Historic Battlefields"

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AB141 - Type 95 Ha-Go Light Tank

AB155 - Japanese Phosphate Drying Plant

AB168 - Japanese Fuel Storage Bunker/ Peleliu WWII Memorial Museum

AB14-111 - Artificial Cave (Navy Rectangular type) - Storage Cave

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Executive Summary

The Republic of Palau is an archipelago of some 350 islands located on the western rim of the Carolines in Micronesia and near its southern tip lies the island of Peleliu: a small 15km^2, low platform reef island of uplifted coralline limestone reef and high limestone ridges (Figure 1). Although it may appear isolated today, in 1944 Peleliu stood at a strategic crossroads in the Pacific theatre of operations as World War Two (WWII) raged on into its fifth year. With its airfield and strong garrison this vital link in Imperial Japan's National Defense Zone posed a potential threat to the United States of America's westward offensive across the Pacific towards the Philippines. On 15th September 1944, US armed forces conducted a seaborne invasion of Peleliu thus beginning one of the fiercest, bloodiest and longest battles of WWII; 73 days of relentless fighting followed during which nearly 16,000 men of both sides lost their lives.

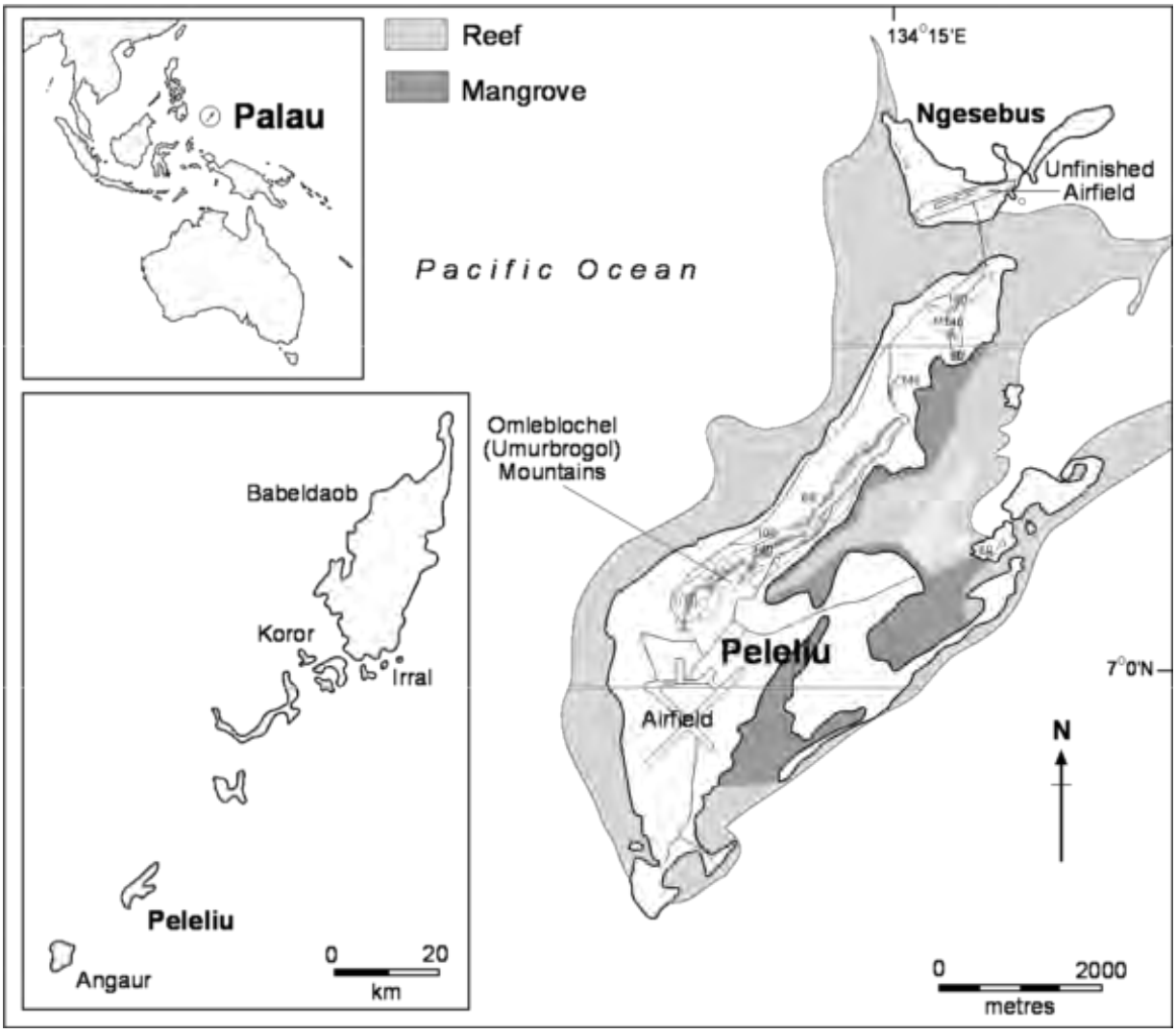


Figure 1 - Peleliu location map (Price and Knecht 2012: 6)

Project Background

As a result of the battle fought in 1944, the island of Peleliu is now host to one of the best preserved and least disturbed WWII battlefield landscapes of the Pacific Theatre of Operations; in recognition of this it has been designated a US Historic Landmark since 1984. In November 2014 the Department of Archaeology at the University of Aberdeen (UoA), UK was awarded a contract by the Peleliu War Historical Society Inc. (PWHS), a United States of America 501(c) 3 organization, to undertake a combined scheme of archeological field and archive based research on selected areas within the Peleliu Battlefield National Historic Landmark. The grant that funded this work was awarded to PWHS by the United States Department of the Interior, National Park Service, American Battlefield Protection Program (Grant agreement no: GA-2287-13-018).

The Peleliu Archeological Survey 2014 (PAS'14) undertaken by UoA built upon archeological surveys carried out by D. Colt Denfeld in 1981 (1988) and a joint team from UoA and the Republic of Palau's Bureau of Arts and Culture in 2010 (Knecht *et al.* 2012). It took place at a time of burgeoning interest in the Battle of Peleliu following the release of the American HBO miniseries *'The Pacific'* in 2010, which has since led to an increase in battlefield tourism, commemorative practice and amateur exploration of archeological sites. With elevated visitor numbers and natural phenomena, such as tropical storms, having a potentially detrimental impact on the integrity of the archeological resource, and with much of the battlefield still remaining un-investigated beneath thick tropical forest, further archeological survey and associated research was considered of utmost importance to the interpretation, preservation and long term management of the battlefield.

Project Aims

The principal aims of the project were:

1. To undertake a pedestrian archeological survey to record historic military sites within two specified and previously un-surveyed areas of the Peleliu Battlefield National Historic Landmark;
2. To conduct archival research on the Battle of Peleliu focusing specifically on sourcing and copying US Marine Corps and US Army photographs from the US National Archives and Records Administration (NARA).

Project Delivery & Data Collection

In order to address the principal project aims set out by PWHS, PAS'14 undertook an intensive schedule of archive, desk and field based research through the winter of 2014-2015. In short summary the principle activities involved:

1. A desk based pre-fieldwork assessment of available historical photographic, textual and cartographic sources to inform fieldwork methodologies, site interpretations and navigation;
2. Conducting a non-intrusive archeological walkover survey in full cooperation with a professional Explosive Ordnance Disposal (EOD) company of two previously undocumented areas of the Peleliu Battlefield Historic Landmark thought to contain historically sensitive defense sites including caves;
3. Selective re-evaluation and condition assessment of selected sites previously recorded as part of the BAC/UoA 2010 survey;
4. Close cooperation with local government officials, heritage protection agencies and other independent stakeholders;
5. Training local island residents in archeological survey techniques enabling deeper engagement with and increased understanding of Peleliu's rich wartime heritage resource;
6. In depth investigation and copying of relevant historical photographs and textual sources relating to the Battle of Peleliu held at the US National Archives and Records Administration (NARA) and the US Army Heritage & Education Centre (USAHEC);
7. The production of a detailed tactical terrain analysis for each of the specified areas surveyed - this required the production of an accurate topographic map of Peleliu;
8. Post-fieldwork evaluation and interpretation of all sites recorded including the association of archeological sites and features to locations and events recorded in historical battlefield narratives, texts and images;
9. Production of a Geographical Information System (GIS) compatible site database containing site description, location and human remains data to aid future management of the archeological resource;
10. A series of reflective recommendations to support future initiatives directed towards the long term sustainable preservation and interpretation of Peleliu's WWII battlefield.

This report represents the principal output and summary of the work carried out by UoA for PWHS and is supported by raw data and additional documentation as detailed in the Scope of Work; these have been provided directly to the client (PWHS) in digital format as a series of preservation products.

Project Results

1. Fieldwork

Fieldwork was conducted over 11 days between the 4th and 14th of December 2014 under the supervision of co-principal investigator Dr Rick Knecht and led by the principal author Gavin Lindsay. Cleared Ground Demining (a UK registered, independent, not-for-profit organization) provided an EOD team of no less than five EOD professionals throughout the survey who screened all areas ahead of the archeological survey team. Fieldwork largely consisted of rudimentary walkover (pedestrian) survey across 49 acres of mixed terrain and tropical forest in Area A (a narrow strip of the eastern Omleblochel Mountains extending from The Horseshoe/Mortimer Valley in the south to just north of the 321st Infantry Trail) and 46 acres of similarly steep, undulating topography and dense vegetation in Area B (a roughly square expanse of northern Peleliu containing the full extent of the Chemiangel Mountains). PAS'14 recorded a total of 260 individual (see table below) or clustered archeological sites and artifacts with 274 individual coordinate points captured relating to the individual features or concentrations that form elements of these sites/assemblages.

As a secondary objective to the walkover survey, a jungle floor artifact survey was carried out in The Horseshoe/Mortimer Valley basin. This offered a means of assessing the previously unrecorded artifact and macrofact (large artifacts such as artillery pieces) horizon that thickly covers the jungle floor throughout the central combat zone (CCZ) of the battlefield. Just over twice as many individual or grouped artifacts/macrofacts were recorded than sites during the survey of The Horseshoe/Mortimer Valley (42 sites and 83 artifacts/macrofacts). Valuable information was gathered through the recording and interpretation of the jungle floor artifact horizon and serves as a strong indicator of how valuable every object is to understanding the battlefield more fully. If the ratio of sites to artifacts is consistent across other areas of the battlefield, or at least within the CCZ, then it is highly likely that the number of battlefield related 'sites' thus far recorded in all previous surveys could almost double. In the original bid to tender UoA estimated that up to 100 previously unrecorded

cave sites may exist within the survey areas designated A and B. Although only 14% of that acreage was covered in 2014 owing to vegetation density, natural hazards and inaccurate maps, 57 natural and artificial cave sites were recorded. More than the estimated cave site number may therefore still survive across the remaining 86% of un-investigated ground in Area A and B.

Site Classification	Sites Recorded in Area A	Sites Recorded in Area B	Sites Recorded Across Both Areas
Air crash sites	3	0	3
Artifacts/Macrofacts (individual & assemblages)	104	2	106
Artificial Caves	17	7	24
Bomb Craters	0	3	3
Burial Grounds	1	0	1
Field Fortifications (unknown or mixed provenance)	6	5	11
IJ Field Fortifications	9	9	18
IJ Support Infrastructure	3	0	3
Improved Natural Caves	2	10	12
Natural Caves & Rock Shelters	16	8	24
Palauan Sites	8	0	8
Pre-War Phosphate Activity Sites	3	2	5
Sealed Caves	2	0	2
US Field Fortifications	23	17	40
Total Sites Recorded	**197**	**63**	**260**

The figures listed above speak for themselves and clearly illustrate the quantity and density of battlefield features that still exist on Peleliu today. Of particular interest has been the significant presence and remarkably high standard of preservation of more ephemeral site classes such as field fortifications. The monuments in this class, which includes skirmisher trenches and rifle pits, are often little more than hastily erected low walls of coral rubble and have been poorly documented, if at all, in the past. PAS'14 has demonstrated that not only are they a highly prolific site type but they are also an incredibly informative one providing, in some cases, an intimate snap shot of individual actions on the battlefield.

Generally speaking, site integrity, uniqueness of assemblage, quality of preservation and therefore level of obtainable archeological data was higher in more remote areas. However, sites of remarkable complexity and completeness were also found at well visited locations and close to population centers. Even where disturbance was evident, sufficient data remained to interpret sites in detail. The surviving material remains from the battle of Peleliu

are truly remarkable and offer exceptional detail and insight into the brutal combat that took place across the island 71 years ago.

2. Public Outreach & Community Capacity Building

PAS'14 sought to involve the people of Peleliu (chad ra Beliliou) actively in the process of archeological survey. The hazards from close proximity working to explosive remnants of war (ERW) and risks to archeological resource integrity through revealing site locations meant open public participation was unfeasible. An alternative plan to work with the Peleliu Rangers also did not materialize, however, a very successful system was implemented through closely working with the local islander EOD technicians from Cleared Ground Demining (CGD). When it did not interfere with their primary EOD responsibilities, members of the CGD team participated in on-the-job training where they learnt, observed and then carried out archeological site recording alongside the UoA survey team. In this way members of the younger generation of islanders interacted with, documented and contributed to the broader understanding of their wartime heritage. A more formal practical training session with members of the CGD team was conducted towards the end of the fieldwork season which provided an in-depth course in the archeological recording methods and techniques employed by the UoA team during the survey. All surplus recording sheets as well as digital templates were left with CGD prior to leaving the field to enable staff to practice and implement what they had learnt either professionally as part of their EOD role or recreationally.

Although limited in its reach, the capacity building training carried out with CGD has demonstrated that there is both enthusiasm and interest amongst the younger generation of islanders to learn more about the wartime heritage of their island, its associated sites and stories. It has also shown that there is a genuine desire to learn new archeological skills that allow them to read, understand and identify with their battle-scarred landscape more fully. As a means of engaging with the wider island community, a weather resistant poster or series of posters summarizing the results of the 2014 fieldwork and archive research will be displayed in a prominent place in Kloulklubed village on Peleliu. It is hoped that through this visual and informal means of interpretation visitors and residents will gain a better understanding of the global importance of the WWII material legacy on Peleliu, its vulnerability to natural and human induced decay and the value of preserving it in situ.

3. Archive Research

A 12-day archive research trip to the United States Army Heritage and Education Centre (USAHEC) in Carlisle, Pennsylvania and the United States National Archives Records Administration (NARA) in College Park, Maryland was conducted between the 17th and 28th of March 2015. Photographic and textual archive sources were successfully consulted at both repositories with partial or full digital copies made using photographic copy stands depending on the relevance of the source content to the project.

A total of 30 archive sources were successfully consulted at USAHEC with digital copies made either in part or in full depending on the relevance of each source's content to the project. An identical approach was taken at the College Park facility of NARA with particular emphasis placed on the Still Picture holdings as the consultation and copying of historic photographic material was placed as a high priority in the Scope of Work. Over six days, a total of 78 archive boxes were reviewed (48 boxes of photographs and 30 containing textual sources). 44 boxes from the Still Pictures Unit were copied and particularly relevant portions of 9 Textual Records were also copied.

The archive research has been a highly enlightening and informative exercise providing valuable historical insight not only into the experiences of the US 1st Marine Division on Peleliu but also the US Army's 81st Infantry Division and the Imperial Japanese Army's 14th Division. Photographic and textual sources have been invaluable in the formulation of this report revealing some previously unseen depictions of the fighting and providing a unique Japanese perspective to help create a more balanced overview of the battle. The sources have also assisted with the interpretation of individual sites, features and artifacts, as detailed in this report, and allowed them to be connected to specific – sometimes split second – events in the battle. Although considerable material was copied, further research visits would be required to examine the full extent of sources available on Peleliu. To assist with any future project, tables detailing the documents consulted are included as appendices to this report. It is envisaged that these should serve as effective starting points or finding aids to direct any future archive research.

Recommendations

1. Future Fieldwork

PAS'14 has demonstrated that exceptionally well preserved, historically valuable and informative WWII archeology remains undiscovered in remote areas of the Peleliu battlefield. Further field survey is highly recommended to locate, characterize, define and assess the integrity of the archeological resource which will in turn enable a more comprehensive understanding of the battle to be gained. Although it might be considered slow-paced on account of the challenging terrain and ubiquitous ERW threat, it is the opinion of the authors that walkover survey remains one of the most effective means of assessing the battlefield and recording the sites, features and artifacts that survive, in detail. Inaccurate maps have seriously reduced the effectiveness of previous archeological surveys of Peleliu and PAS'14 was no exception. Targeted walkover survey intended to cover specific landmarks or battlefield features such as the 321st Infantry Trail proved challenging and ultimately unsuccessful. However, with detailed topographic contour data, future survey of specific areas would prove far more successful. With these issues in mind the authors have produced the following recommendations for future archeological fieldwork on Peleliu's battlefield:

- The capture of detailed contour data and the production of accurate topographic maps. Lindsay has sought to rectify this issue through the production of a map (**Appendix 8**) using contour data compiled from 1945 aerial photography. However, the map should not be considered definitive as it remains based on historically interpreted aerial photography;
- Airborne LiDAR offers the best means of achieving an accurate topographic base map for Peleliu;
- Terrestrial LiDAR offers an effective means of high precision sites mapping. Sites would need to be carefully selected for this approach following a basic assessment of suitability and value. Ultimately, a multifaceted approach combining manual and digital recording techniques are likely to produce the best interpretive results in Peleliu's challenging environment;
- With accurate topographic maps future survey work could be targeted at the following geographical areas: south-west Omleblochel hills & ridges • the Coral Badlands • upper slopes and summits of the 5 Brothers Ridge • upland areas north of the CCZ (Unnamed Ridge, Ridge 120, Wattie/Baldy Ridge, Ridge 3, Hill 140, Boyd Ridge, Keller-Miller Boulevard) • Hill 100 on the 321st Infantry Trail • Kamilianlul Mountains and Hill 80.

2. Future Archive Research

Historical records, maps, plans, photographs and textual documents relating to Peleliu still remain uncopied at NARA and USAHEC (pending declassification). Appendix 1 and 2 of this report offer a catalogue of the material consulted and copied during PAS'14. These catalogues could be used to direct any future archive research that PWHS wished to undertake such as gathering a full digital collection of Peleliu related archive materials.

3. Future Online Education

There is a growing public interest in the battle of Peleliu and its material heritage that survives so prolifically across the island. The following are recommended to enhance online education:

- The creation of an online resource or virtual museum would offer an opportunity to proactively engage with visitors, islanders, veterans and amateur historians;
- The website could educate and inform a growing global audience about the battle and the significance of the archeological legacy that survives;
- A carefully managed web presence could also encourage a better informed and more structured form of tourism with interactive online material, downloadable site guides, walking trails and safety advice to direct visitors towards designated routes and sites.

4. Future Public Engagement

Any future work connected with WWII heritage on Peleliu should, wherever possible, seek to involve and inform the local island community. The close cooperative work with CGD personnel has demonstrated that WWII heritage is relevant, valued and of interest to younger generations of Peleliu islanders. Public engagement should be pursued in the following ways:

- Further cooperation with CGD is strongly encouraged to build on the interest that exists within their staff. Through further archeological training CGD staff could be equipped with the skills and knowledge to record and manage the archeological landscape;
- Archeological skills training delivered in association with CGD could potentially be employed by staff alongside the ERW disposal remit or separately as a carefully monitored and managed community archeology group;
- General public engagement involving school visits, presentations, artifact handling sessions, exhibitions and organized site visits would allow other members of the island

community and visitors to engage safely and in a controlled manner with this period of island history. These organized events and activities would also allow important messages to be delivered such as heritage resource sustainability (i.e. retaining artifacts in situ), respecting the integrity of heritage sites and ERW risk awareness.

Concluding Remarks

This report summarizes the results of a very successful archeological research project involving detailed archive and field study. Through the site descriptions contained within Section 3 it is hoped that this report has illustrated how valuable the archeological record of the battlefield is. Every site and object holds its own story to tell which can add details to and complement historical narratives through connection with American and Japanese historical accounts. By reconnecting the material record with historical texts, reminiscences and photographs, a much more detailed and tangible understanding of the conflict that engulfed Peleliu can be achieved.

The detail and understanding gained from surviving sites and artifacts is truly remarkable and emphasizes how even small, sometimes disturbed, discarded or uninteresting objects can contribute to our broader understanding of the battle, its participants and the horrors that they endured. It is therefore of utmost importance that the integrity of the sites and features be carefully preserved, managed and maintained. Retention of context as a mean of facilitating the process of education, understanding, reflection and remembrance therefore cannot be overemphasized. Revisiting sites surveyed in 2010 has revealed continued disturbance through looting practices and decay of remaining artifacts. In spite of this, resurvey has also shown that disturbed sites still contain detailed information and have the potential to reveal valuable insights into even the shortest of moments in the battle.

PAS'14 has sought to readdress some of the imbalance that exists within many of the histories of the battle of Peleliu with this combined archival and field archeological approach. It is hoped that the multi-faceted approach employed and the reflective recommendations produced may inform future studies on the Battle of Peleliu and the wider Pacific theatre of war. In addition, it is the aspiration of the authors that PAS'14 may contribute to the long term sustainable management and interpretation of the battlefield to present and future generations and, in so doing, ultimately bear a more fitting and longer lasting tribute to those who lost their lives on Peleliu in 1944.

Introduction

In 2010 an archeological survey of the Island of Peleliu by a joint team from the Republic of Palau's Bureau of Arts and Culture and the University of Aberdeen demonstrated that amongst the superficially idyllic tropical vegetation of this small, unassuming Pacific island lay one of the densest assemblages of WWII battlefield remains from the Pacific Theatre of Operations (Knecht *et al* 2012: 263). The remarkable scale and relatively undisturbed nature of the material legacy from some of the fiercest fighting of the 20th century makes Peleliu's battlefield one of the best preserved and most historically significant to have survived from WWII. In recognition of the asset that the wartime archeological remains on Peleliu represent and their susceptibility to degradation through looting, increased visitor numbers and natural decay, the Peleliu War Historical Society Inc. (PWHS), a United States of America 501(c) 3 organization, was awarded a grant from the United States Department of the Interior, National Park Service, American Battlefield Protection Program (Grant agreement no: GA-2287-13-018) to conduct further work. In November 2014, PWHS commissioned the University of Aberdeen (UoA) to undertake this work through a combined scheme of archeological field and archive based research. The principal project aims were:

1. To undertake a pedestrian archeological survey and record historic military sites within two previously un-surveyed areas of the Peleliu Battlefield National Historic Landmark;
2. To conduct archival research on the Battle of Peleliu focusing specifically on sourcing and copying US Marine Corps and US Army photographs from the US National Archives and Records Administration (NARA).

This report represents the principal output of the PWHS contract and is intended to offer a summary of the research activities that have been undertaken as part of the project and how they have addressed the two aims detailed above. Through the interpretation of the data gathered from these activities, this document also seeks to offer new and perhaps alternative perspectives on the Battle of Peleliu as well as a series of reflective recommendations to complement future initiatives supporting the long term sustainable preservation and interpretation of Peleliu's unique WWII battlefield.

Section 1 of this report offers a chronological summary of the project's activities as well as a detailed overview of the methodologies employed in the field. Researching Peleliu's

turbulent WWII heritage poses a range of challenges to the archeologist that are as unique as the archeology itself. Studying the battle both in and out of the field therefore demands techniques and approaches that are tailor made to best suit both the environment and the material. It is the intent of this particular section to describe the various methods that the UoA team employed during the Peleliu Archeological Survey 2014 (PAS'14) to tackle the challenges that were encountered and also in so doing, indicate potential best practice for future work.

Section 2 provides a tactical assessment of the Peleliu battlefield's terrain following the five military terrain aspects most commonly referred to by the acronym KOCOA, OCOKA or OAKOC. As a broad assessment of 'Key Terrain, Observation & Fields of Fire, Cover & Concealment, Obstacles and Avenues of Approach' on Peleliu has already been carried out by UoA as part of the previous survey (Knecht *et al* 2012: 13-21), this KOCOA analysis will focus on an assessment of the terrain within the two areas that were surveyed in 2014 considering the role that it played in the nature of the fighting and demonstrating how an understanding of this role contributed to the identification and interpretation of sites recorded during the survey.

Section 3 presents summary descriptions of the areas surveyed during the fieldwork element of the project detailing each of the sites recorded and the historical context in which they are set. This section concludes with an account of the sites from the 2010 survey that were revisited in 2014 with observations of site condition and comments on what this may mean for the future management of the battlefield. The report concludes with Section 4, a general summary of project results and recommendations aimed at aiding the direction of future research. Additional maps, plans, tables or documents referred to within the text have been appended to the end of this report in a series of appendices. **It should be emphasized that <u>NO</u> confidential site location data is contained within this version of the report.** A second version containing sensitive information has been supplied to the client along with other preservation products detailed in the Scope of Work.

PAS'14 built on the skills, experience and positive working relationships developed during the 2010 survey. It was conducted with the approval of the State of Peleliu government authorities; with the support of the Palau Bureau of Arts and Culture (BAC), with respect to

the traditional leadership and community of the Island of Peleliu and in full cooperation with Cleared Ground Demining, without whom the fieldwork elements of the project would not have been possible.

Wherever possible this report has sought to reference native Palauan terms for geographical features of the island landscape. However, 'Peleliu', the western version of the native island name of 'Beliliou', has been retained throughout to minimize confusion. Most notable amongst the native terms used is 'Omleblochel' which is used in place of 'Umurbrogol' (and Bloody Nose Ridge) which is a corrupted form appearing in war and post-war accounts (Murray 2006: 159); it relates to the mountainous central spine of Peleliu to the immediate north of Ngesias village and the airfield. 'Chemiangel' replaces its corrupted form 'Amiangal' as the name for the most northerly mountain range on Peleliu (*ibid.*). 'Ngesebus' is a more subtle misnomer, replaced here by the native spelling 'Ngedebus' to name the island to the immediate north of Peleliu.

Section 1. Project Background

Archeological investigations on the Peleliu battlefield were first undertaken in 1981 by D. Colt Denfeld (1988) who documented 46 key battlefield sites. Other work on Peleliu since then has included a monitoring brief on a rural water system (Beardsley 1997) and a multi-period, island-wide survey by the Palau Division of Arts and Culture (Blaiyok *et al* 1992). The most in-depth archeological examination of the Peleliu battlefield was conducted by the Lindsay, Knecht and Price in 2010 (Knecht *et al* 2012, Price and Knecht 2012, 2013, Price *et al* 2015) and built on Denfeld's exemplary work. The nine-day walkover survey recorded 285 WWII sites across the principal landing beach areas, hinterland, airfield, a relatively small portion of the CCZ and isolated pockets in the north of the island (*ibid.*). The majority of site numbers were issued to distinct structural remains such as standing buildings, foundations, prepared defense works, caves, wrecked vehicles and aircraft, but in 106 cases, the site numbers represented a central point in a larger assemblage of military equipment or hardware that could consist of hundreds of individual artifacts and human remains (*ibid.*). The 2010 survey was initiated by PWHS, a US non-profit 501(c) 3 organization formed in 2005, to preserve the WWII battlefield on Peleliu and nurture the public remembrance of what took place. The work was funded through the US National Park Service's American Battlefield Protection Program as a means of producing an island-wide cultural resource inventory which could

directly inform a broader initiative to develop a preservation plan for the battlefield (Knecht *et al* 2012: 3).

1.0 Project Activities

In May 2014, the Department of Archaeology at UoA responded to a proposal request issued by PWHS for professional consultant services to undertake an archeological survey and assessment of selected areas within the Peleliu Battlefield National Historic Landmark (designated a US Historic Landmark in 1984). The bid for tender was successful and the contract awarded to UoA under the direction of co-principal investigators Dr Rick Knecht and Professor Neil Price. Owing to various administrative complications, the commencement of the contract between PWHS and UoA was set back from the originally anticipated start date of 1st October 2014 to the 15th November 2014. As a consequence, this delay left insufficient time to employ the principal author, Gavin Lindsay, to investigate, plan and execute a visit to the US National Archives & Records Administration (NARA) prior to the scheduled fieldwork commencing in early December. The decision was therefore made to postpone the collection of 'new' material from US archive sources until after the fieldwork had been completed and instead focus on a deeper investigation of the large quantity of archival data already in the possession of the UoA team. This collection was found to provide more than sufficient information to direct field activities such as the capture of 'before and after' photographs (see beginning of report) and in the 2 weeks preceding fieldwork much of the archive material was summarized, digitized and loaded onto a tablet computer for use in the field.

1.0.1 Fieldwork

Fieldwork was conducted over an 11 day period between the 4th and 14th of December 2014 under the supervision of Knecht. It was structured so as to observe the traditional village ranking protocol of Peleliu and began in The Horseshoe/Mortimer Valley area which falls within the territory of the second-highest ranked traditional village of Ngesias. Fieldwork in the Chemiangel Mountains, within the territory of the third ranked village of Ngerchol, followed this. Lindsay coordinated and led an archeological survey team of five volunteers (Dr Benjamin Raffield, Dr Phillip T. Ashlock II, Charles Bello, David McQuillen & Robert Raney), three of whom were professional archaeologists (Raffield, Ashlock & Bello). Two members were trained Emergency Medical Technicians (Bello & McQuillen). Whilst in the field, the archeological team was accompanied by an EOD team provided by Cleared Ground Demining,

an independent not for profit organization, and led by Operations Director Steve Ballinger (Figure 2). On any given day, the EOD team consisted of two locally trained EOD Level 1 Technicians and two Searchers under an Operations Director although personnel often exceeded this number. The UoA team was also joined for several days by John Currie, a skilled photographer and surveyor with a deep interest in the battle of Peleliu, who had been working closely with Cleared Ground Demining on a number of cave mapping projects.

Figure 2 - The combined archeological survey & CGD team
Front row *(left-right): Guy Takada, Rodney Pasqual, Phillip Ashlock and Grandy Ngirabiol.*
Back row *(left-right): David McQuillen, Richard Madrekeuet, Gavin Lindsay, Steve Cypra, Cynric Kebekol, Rob Raney, Rick Knecht, Ben Raffield and Steve Ballinger. N.B. Charles Bello absent from photo.*

Prior to the commencement of fieldwork, efforts were made to consult with local constitutional government officials, the traditional chiefly authority and other stakeholders to notify them of the archeological survey schedule and ensure that the intended scheme of work was both convenient and appropriate. Pre-fieldwork communications with the Peleliu State Governor and tribal Chief Obak were conducted through Steve Cypra, an honorary citizen of Peleliu, who not only represented the client (PWHS) but also the Peleliu State Historical and Cultural Commission of which he is the acting chairman. Unfortunately, the Governor of Peleliu and the traditional chiefs were off-island on business and not available to attend a meeting with the UoA team during the fieldwork season, but the Governor was regularly kept informed of progress by Mr Cypra who accompanied the archeological survey team in the field. In our proposal we stated that our public engagement would follow the lead of the Governor's office. In the event the Governor was off-island on other business during nearly our entire stay on the island as were both traditional chiefs. The Governor's office and chief's residence were both visited with respects paid through leaving traditional

gifts of food. BAC was approached at the beginning of the contract and invited to accompany and observe the survey. Although BAC were unable to accept this invitation, owing to other service commitments, regular contact was maintained with Acting Director Sunny Ochob Ngirmang which included meetings in Koror before and after fieldwork as well as several meetings on Peleliu during the survey. A preliminary findings report and copies of all survey data was submitted to BAC by Knecht prior to departure of the UoA team from Palau. Good relations were also established with members of a Japanese human remains repatriation team and an observing representative of the United States Defense POW/MIA Accounting Agency who were working on Peleliu at the same time as UoA.

1.0.2 Public Outreach & Community Capacity Building

It was a particular ambition of the UoA team to involve the local community in the process of archeological survey, not simply passively through the dissemination of results, but actively through participating in looking for, identifying and recording sites within the war-torn island landscape in which they live. Community Archaeology, as practiced in the UK, creates opportunities for individuals or groups with no professional archeological experience to develop new skills and learn more about the past in their local area through archeological investigation (Moshenska 2008: 52). Such projects are varied and dynamic, focusing on a range of historical periods across the globe and all demonstrate the socially constructive benefits that come from communities actively engaging with the archeology around them and taking ownership of the past (Marshall 2002, Moshenska and Dhanjal 2012). These benefits can be viewed both in terms of creating added interest in, understanding of and appreciation for the material remains but also in terms of bringing people together: identifying with each other and the past through shared experience. These interactions can, in turn, contribute to the future safeguarding of archeological monuments and landscapes through an enhanced sense of meaning and value attributed to heritage places by their inclusion in peoples' narratives; a process that occurs through the performance of participation (Anico and Peralta 2009: 1).

In his thesis, Murray (2006) shares the voices and feelings of the war and post-war generations of Peleliu Islanders whose land, homes and way of life were irrevocably changed by the Battle of Peleliu and the occupying colonial powers that preceded and followed it. For the 'chad ra Beliliou' (people of Peleliu), a people whose sense of identity is highly locative

and intimately linked to the landscape through memory, oral historical tradition and physical markers (Murray 2006: 29), the sweeping away of those markers and the debris of WWII that now occupies the sites where they once stood offers a daily reminder of what has been lost (*ibid*: xii). To be effective, identities require a degree of materiality as a means of connecting people to the biography of a place (Anico and Peralta 2009: 1) and so it is understandable just how significant the loss of such important physical links to the ancestral past have been for a small island community. Nevertheless, in spite of its negative symbolic power, the battlefield's archeology has become part of the island narrative: its past, present and future. By this measure it belongs to the chad ra Beliliou and is as much a part of the island *place* that they are so deeply connected to as the sites and stories of their native Palauan heritage (Murray 2006: 363).

The reality of Peleliu's wartime past becoming an integrated part of the island's, and therefore people's, story is perhaps a process that is most apparent in the younger generation of Peleliu Islanders. For the late 20th - early 21st-century islander, who has not witnessed the pain of the collective loss from WWII first hand or grown up during the hardships of post-war recovery, the archeology and story of the battle of Peleliu has always been a part of the landscape. It is just as equally imbedded in time as the more distant, traditional tribal sites and associated stories. Though approaching the archeology of the battle from a different perspective to older members of the community, the same social values and importance placed on physical markers as a means of connecting to the past and asserting identity apply. For the younger generation then, the material remains from recent conflict serve as physical markers to different stories and memories that are just as valid as the tradition markers, offering channels through which to learn about, understand and remember a period of dramatic change in Peleliu's history.

During the fieldwork in December 2014, the UoA team was able to work with members of the younger generation of the chad ra Beliliou where the process of recording and interpreting the archeological sites provided a means of direct interaction with the 'physical markers' from their island's past. Although the anticipated opportunity to work with the Peleliu Rangers did not materialize during the 2014 fieldwork season, and the risk of site degradation through looting prohibited an open invitation to the general public, the archeological team had the privilege of working alongside the local islander EOD technicians

from Cleared Ground Demining (CGD) each day. These young men had grown up exploring the sites around their island and for at least one the curiosity to discover and understand more about this time in his island's history encouraged him to train as an EOD specialist and work for CGD (C. Kebekol, pers. comm. 12 December 2014). All of the locally trained CGD team members expressed a great interest in developing archeological recording skills and learning a new way of reading their landscape. Throughout the survey Lindsay and other members of the team exercised on-the-job training, explaining how the recording was taking place, why the particular process was being carried out and what our observations told us about what had taken place in the given location (Figure 3). Whenever it did not interfere with their primary role as EOD technicians, members of the CGD team were encouraged to assist in the process of recording: by taking measurements with archeological equipment or making observations and interpretations about the sites and artifacts encountered. On the penultimate day in the field (Saturday 13th December), Knecht and Lindsay led a more formal practical training session where members of the CGD team were given an in-depth course in the archeological recording methods and techniques which the UoA team had been implementing throughout the survey. Volunteers on the UoA team also joined in with the practical training session: taking the opportunity to carry out recording tasks that were different to those they had been assigned to during the survey. Prior to departing Peleliu, all surplus recording sheets as well as digital templates were left with CGD so that members of their staff and the Peleliu community, such as the island Rangers, can continue to develop and apply archeological recording methods either professionally or recreationally.

Figure 3 - Local capacity building: 'on-the-job' training & practical session

By looking at the material and sites they encounter on a daily basis in a different way, members of the Peleliu community gained an enhanced understanding of what took place in a particular location on their island during WWII. Interactions with the material evidence in this way, instead of through the pre-constructed historical narratives set down in published literature, thus created opportunities for members of the chad ra Beliliou to establish new stories of the battle: stories about their island's past, told through physical markers in the landscape, read and understood by the people who live and work in that landscape.

Following the submission of this report, it is the intention of UoA to produce a weather resistant poster or series of posters summarizing the results of the 2014 fieldwork and archive research. It is envisaged that these posters will be displayed in a prominent place in Kloulklubed village on Peleliu where island residents and visitors will be able to find out more about the recent archeological work that has been undertaken. It is hoped that, through this visual and informal means of interpretation, visitors and residents will gain a better understanding of the global importance of the WWII material legacy on Peleliu, its vulnerability to natural and human induced decay and the value of preserving it in situ. It is also hoped that a greater appreciation for WWII sites and objects as physical markers that can tell unique and valuable stories may be afforded as part of this dissemination process.

1.0.3 Archive Research

Following a period of field data processing at the beginning of 2015, a 12-day archive research trip was planned and carried out by Lindsay to address the second principal aim of the PWHS contract. The trip took place between the 17th and 28th of March 2015 and involved four days of research at the US Army Heritage and Education Centre (USAHEC) in Carlisle, Pennsylvania followed by six days at the US National Archives Records Administration (NARA) in College Park, Maryland. Discussions with UoA volunteer team member McQuillen greatly aided the planning stages for this trip and highlighted the potential of USAHEC as a source for material relating to the latter stages of the battle of Peleliu when the US Army's 81st Infantry Division relieved the US 1st Marine Division. McQuillen's exemplary independent research efforts made large quantities of photographs and documents from NARA available to the UoA team during the 2010 survey and through consultation it was possible to decrease the chances of duplication and identify sources that would augment those already collected. Lindsay was joined by Ashlock who generously

volunteered his time and expertise for the duration of the visits to both archive venues (Figure 4).

Upon arrival at USAHEC, it was discovered that the archives were undergoing a censorship review whereby the security classification of all catalogue entries were being checked. The incredibly helpful and highly efficient staff worked hard to 'clear' as much Peleliu material as possible and as a result only one box file containing approximately 20 images of Peleliu taken by the 81st Infantry Division failed to be processed in sufficient time to be viewed during the visit (RG65S Unit Histories Photo Collection). A total of 30 archive sources were successfully consulted with digital copies made, either in part or in full depending on the relevance of each source's content to the project, using the photographic copy stands. Appendix 1 provides a table listing all of the sources that were consulted at USAHEC with a brief summary of content for each including sub-folder descriptions where these were present within larger box files. Some of the images and documents viewed have proven to be very informative and enlightening. Of Particular note are two files held on microfilm that form part of a large collection of the US Army Historical Division known as the Japanese Monographs. The two documents in question were compiled by the 1st Demobilization Bureau in September 1946 and draw on records and memories of Imperial Japanese General Headquarters and Army Division Staff Officers. Together these documents offer a unique Japanese perspective on operations in the Central Pacific Area of Operations and most notably on the build-up of strategic defenses in the Palau archipelago, Peleliu specifically and the battle that took place. The authors have drawn on these sources within Section 2 and 3 of this report and highly recommend their inclusion in any future interpretation of the broader battlefield as a means of balancing the presented perspective of the battle.

Figure 4 - Ashlock studying archive documents at USAHEC (left) & NARA (right)

The College Park facility of NARA was selected as the main focus for the PAS'14 archive research as the Still Picture holdings at this venue contain over 14 million analogue and one million digital photographs and graphic images. Consultation with McQuillen and investigation of the online catalogue prior to the visit identified College Park as the repository of the six boxes of US Marine Corps (USMC) photographs taken on Peleliu during WWII. In addition, enquiries with the staff of the Still Picture Unit revealed that a large quantity of wartime photographs of Peleliu existed within the General Records of the Department of the Navy. College Park also houses modern military textual records post-dating 1900 as well as cartographic and moving image collections; these all contain relating to the Battle of Peleliu making this NARA repository an excellent one-stop-shop for accessing archival material relating to Peleliu. Upon arrival, it was found that another researcher was working with the USMC Peleliu collection (Record Group (RG) 127-GW, boxes 43-48) and so it wasn't possible to gain access to these images until the latter half of the week. As a consequence, time did not prove sufficient to make copies of the entirety of this series; however, it is now estimated that with the addition of the images copied by McQuillen in 2009, approximately 90% of the collection has now been digitized and made accessible to PWHS. Whilst awaiting access to the RG 127-GW boxes, priority was given to investigating the less well-known US Navy collection (RG 80-G) as well as the Office of War Information collection (RG 208-AA) and the US Army Signal Corps collection (RG 111-SC). Access to these collections is through an alphanumerical keyword card directory which is used to identify individual photograph numbers within boxes of a collection. In many cases this meant that the images relating to Peleliu were spread across a large number of boxes constituting only a small portion of the archive box contents. Identifying, requesting, processing and then copying the contents of such a large quantity of boxes was therefore a very time-consuming process. Once the RG 127-GW boxes became available, it was discovered that some of the RG 80-G and RG 111-SC series were duplicates. However, the significant advantage of the latter collections was that many of the images were three times larger affording a much higher level of detail and clarity than the USMC images, an attribute of particular value for studying the vertical and oblique aerial images.

Over the course of the six days at NARA, a total of 78 archive boxes were inspected (48 boxes of photographs and 30 containing textual sources). 44 boxes from the Still Pictures Unit were copied either in part or in whole and elements of 9 were copied from Textual Records. Similar

to the USAHEC collection, an inventory has been provided in Appendix 2 which lists all of the sources that were investigated at NARA with a brief summary of content for each and an indication of where copies were made. The intention of supplying the lists in Appendix 1 and 2 is to provide the client with as much information as possible about the nature of the archive resource relating to Peleliu and, in so doing, offer finding aids to direct any future archive research that PWHS may wish to carry out. Highlights from the NARA collections are almost too numerous to mention as each photograph tells its own story and each document contributes its own unique perspective to the understanding of the battle. However, Japanese Prisoner of War reports and captured maps detailing US and Japanese troop positions rank highly in value for offering previously unknown insights on the fighting. Also, the photographs taken by the 28th Photo Reconnaissance detachment of the 323rd Regimental Combat Team, 81st Army Infantry Division (RG407-10391-381) reveal some previously unseen depictions of the fierce fighting in the CCZ as experienced by the Army as they fought to gradually reduce the size of the final pocket of resistance. What was certainly clear from this research trip was that several visits would be required to copy the vast wealth of material available on Peleliu.

1.1 Fieldwork Methodology

In 2010 the University of Aberdeen undertook the first archeological survey of Peleliu making use of the latest techniques. This 'pedestrian survey' not only highlighted the remarkable preservation, density and richness of the archeological resource but also the unique challenges that it presented to the process of identification and recording. The thick jungle vegetation, steep rugged terrain, high humidity, limited vehicle access for moving bulkier survey equipment and risks from explosive remnants of war (ERW) also contributed to making Peleliu's battlefield a highly demanding environment to survey. In 2014 the UoA team drew upon the extensive experience it gained in the field four years previously, developing a custom made survey methodology to suit both the archeology and the conditions. In the case of some monument classes such as the defensive caves, a degree of innovation and deviation from standard practice was required in order to best suit the demands of the natural setting and facilitate the more detailed recording of the sites. As a result, the UoA team deployed a number of different techniques, some of which were experimental, during the 2014 survey. Together the methods offered portable, accurate and efficient recording solutions to meet the variety of site types and environmental challenges encountered whilst providing the

team with the capacity to collect archeological data at a range of scales and detail. In the following sub-sections, each of the techniques employed is explained with supporting examples.

PAS'14 was conducted in accordance with the 5 Principles of the Chartered Institute of Archaeologists' (CIfA) Code of Conduct (CIfA 2014a) and closely adhered to their standard and guidance for archeological field evaluation under which it classified as limited, non-intrusive fieldwork (CIfA 2014b: 4). All techniques employed were non-destructive and came under section 3.3.11 as either category 1.iv earthwork survey, category 1.v field scanning (observation and mapping without collection) or category 1.vi standard building survey (CIfA 2014b: 11-12). By adhering to this code of conduct, PAS'14 also met the standards and guidelines for archeology and historic preservation set by the US Secretary of the Interior (USSotI), in particular the standards for identification. Under Standard II, the archeological field survey was conducted using systematic gathering and recording techniques. It classified as Intensive Survey as sufficient data was collected to permit the evaluation of site significance (US Secretary of the Interior 1983).

1.1.1 Walkover (*Pedestrian*) Survey

The primary site identification and recording technique applied throughout PAS'14 was rudimentary walkover where the archeological team systematically traversed a predetermined route across the terrain on foot. Upon discovery of a site (the term used to define a single or group of associated archeological features), the extent and form were determined, written and photographic records completed, and the location logged using handheld GPS (Figure 5). A number was issued to each individual site that was recorded. In compliance with USSotI Standard III (*ibid.*) and CIfA guideline 3.3.7 (CIfA 2014b: 11), a pro-forma site recording form was used (see Appendix 3) which maintained consistency and standardized recording practice across all sites and between team members. Feature letters were issued as a suffix to site numbers when multiple features were found in close proximity to one another but considered too important or located too far apart to be grouped under a single grid coordinate. In the majority of cases, feature letters were issued when features were interpreted as being part of the same site and therefore best described on the same recording form. Features could include multiple defense positions forming part of a strong point or concentrations of artifacts within very large artifact assemblages. In some cases,

features have been reinterpreted as not being directly associated to a specific site but have instead retained their original suffix.

Measurements were taken using a combination of hand tapes, 20m measuring tapes and DISTO laser distance measurers. The Garmin 64S was used to record site positions owing to its ability to achieve high location accuracy under jungle canopy through the high-sensitivity GPS/GLONASS quad helix receiver and antenna. These units also had the facility for uploading color topographic maps and utilized high-resolution BirdsEye satellite imagery which significantly aided navigation as well as onsite assessment of site proximity to key geographical and battlefield features. Efforts were made not to disturb much of the vegetation which was helping to protect the sites from looting and was only cleared when necessary for determining extent, aiding interpretation or improving photography. In accordance with the Scope of Work, vegetation clearance was solely carried out by Cleared Ground Demining (CGD) personnel who were the only members of the team equipped with machetes.

Figure 5 - Photographic, written & GPS recording of sites identified during walkover survey

Following CIfA guidance section 3.3.9, health and safety took priority over archeological matters (CIfA 2014b: 11). A daily morning meeting was held between Lindsay and Ballinger where the intended survey route and agenda for the day were mapped out and agreed (Figure 6). A briefing to relay this information to the rest of the team was then carried out prior to entering the field. Once in the field, the UoA team conducted the walkover transects behind a screen of CGD personnel who cleared route ways through the dense low level undergrowth and fallen trees (a legacy from Typhoon Bopha in 2012) as well as marking unexploded ordnance hazards encountered enroute (Figure 6). In parts of survey area A, the

vegetation was far denser than anything previously experienced; this reduced visibility in some places to a matter of meters, slowed progress and forced a single file formation to be adopted. The CGD team also erected safety rope lines and provided assistance when scaling and descending precipitous ridges or accessing more remote caves (Figure 6).

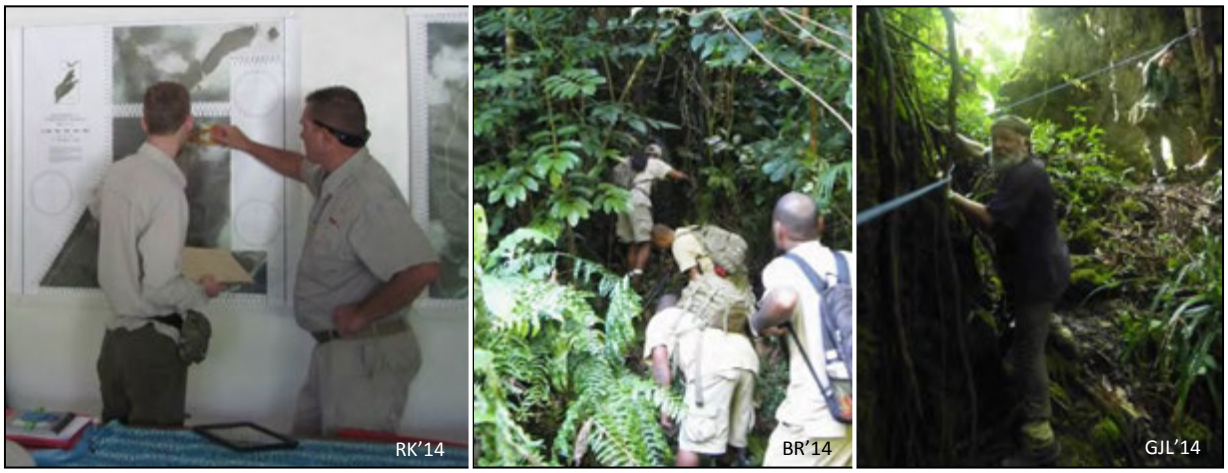


Figure 6 - Morning 'Ops' meeting (left), CGD team cutting a trail (center) & CGD safety rope line (right)

1.1.2 Jungle Floor Artifact Survey

In parts of the battlefield where the undergrowth allowed clear observation of the jungle floor, large quantities of discarded military material was found which ranged in size from small arms projectiles and shrapnel fragments to twisted metal storage drums and ammunition carts. In 2010, the concentrations were found to be particularly prevalent within areas of the CCZ, such as Death Valley and Wildcat Bowl, where examples were photographed and in several cases, fully recorded. No systematic survey of this material has ever been carried out on Peleliu and so it was decided to conduct an evaluation of the artifact and macrofact (large artifacts such as artillery pieces) horizon on the battlefield as a secondary objective alongside the primary walkover survey. The jungle floor artifact survey was carried out in the base of the Horseshoe/Mortimer Valley in Area A which offered a contained space within the CCZ. One GPS unit was allocated to artifact recording and a separate numbering system was used with the prefix of 'SF' (Small Find) applied to differentiate artifacts from sites. As the walkover survey moved forward, any artifacts observed on the jungle floor were called out and marked with a length of high visibility tape. Ashlock took responsibility for visiting each in turn, logging its position, photographing and writing a basic description of the object or group of objects before lifting the tape. All members of the team participated in initial small find detection, while Raney proved particularly adept at spotting such objects and took a lead role in this task. Efforts were also

made to accurately characterize artifacts in the field and a tablet computer preloaded with military equipment and ordnance manuals was used to great effect for cross checking particular types and assisting with the more challenging or ambiguous artifact definitions (Figure 7).

Figure 7 - Using a tablet computer to positively identify macrofacts in the field

Although the jungle floor artifact survey was intended to be carried out solely in the Horseshoe/Mortimer Valley, the method of differentiating artifacts and macrofacts from sites through the use of a separate numbering system proved so helpful, especially in areas of high site and artifact density, that the arrangement was retained for the rest of the survey, yet was only used for recording artifacts of special importance. Where it was considered useful in understanding the nature of the fighting in a particular part of the battlefield, unexploded ordnance (UXO) was issued with a small find number and recorded. Detailed records of all ERW encountered during the survey were compiled by Ballinger, who photographed and GPS located each item as it was discovered ahead of its safe removal and disposal once the archeological survey had been completed.

1.1.3 Measured Cave Survey

Recording caves and documenting their content was found to be a particularly challenging aspect of the 2010 survey with the high heat and humidity, lack of natural light, stale air and limited mobility putting considerable strain on the recording process. A custom-made recording form was produced for PAS'14 which was intended to simplify and standardize recording, offering prompts to the archeologist and ultimately minimizing the time required within such difficult conditions. A cave classification chart was also produced using Phelan's

intelligence summary of Japanese caves on Peleliu (Phelan 1945) which aided the characterization of cave sites into specific types.

Prior to entering caves, the approaches, access points and interiors were thoroughly examined for explosive remnants of war by the EOD technicians of CGD. Explosive as well as dangerous chemical materials were clearly marked with hazard tape which, in some cases, led to entire areas within a cave being cordoned off. Before entry, the archeological team was fully briefed by Ballinger on specific hazards present at each location, and members of his team were strategically positioned within the caves to provide assistance and further direction as and when required. If a site was considered too hazardous to enter then only basic recording of the exterior was undertaken from a safe distance. Descriptions of the interior were gathered from the EOD technicians who had conducted the preliminary site inspection.

Where visible, primary and secondary cave access points were measured, sketched, described and photographed on the same recording form and their locations individually logged with a GPS (Figure 8). Additional features that may be associated with a cave, such as a flat area for a heavy weapon or defensive revetment walls, were also noted. Sketches and written descriptions were made of cave interior architecture on the same recording form as the exteriors and measurements taken using DISTO laser distance measurer. Concentrations of artifacts were marked on the sketch plans and annotated with inventory lists of the key artifacts that each concentration contained. Such detailed locating of distinctive artifacts and features allowed photographs to be accurately re-associated with specific spreads of material during the post-processing phase thus greatly aiding site interpretation. The most successful photographic results were obtained through the use of natural effect LED flashlights on a diffused, wide-angle lens setting held on either side of the photographer. In some cases, this crossbeam effect was found to be so effective that the camera's natural daylight settings could be successfully used.

In addition to this standard method of cave survey which was applied across all cave sites during PAS'14, an experimental form of detailed cave recording was tested. This method utilized a Leica DISTO laser distance measurer fitted to a compact, yet sturdy, camera tripod equipped with a 360° bearing wheel (Figure 9). Set up at optimal locations within the cave,

distance and bearing measurements of the walls and interior features were manually plotted at scale on drafting film to produce a 2D plan of the cave interior (Appendix 4). The plan and survey stations were georeferenced by tying in to a GPS coordinate taken at the entrance to the cave. Section slices of the cave were also plotted and georeferenced photographs achieved by interchanging the DISTO on the survey station with a camera.

Figure 8 - Raffield recording exteriors and interiors of caves

Although taking longer than the standard cave recording system employed, this technique enabled the production of an accurate archeological map of the cave test site with a higher level of resolution and detail. Larger, heavier Total Stations or Laser Scanning equipment is readily available for accurate survey work such as this, but such devices would undoubtedly have left a more intrusive footprint on the archeological deposits and may have risked the disturbance of sub-surface ERW. Comparative work conducted between a variety of survey methods and devices at Skoteino Cave, Crete, Greece (Tyree *et al* 2014) would also suggest that neither a Total Station or Laser Scanning system would have been entirely effective for surveying Peleliu's caves.

Figure 9 - Detailed cave survey of AB14-058

1.1.4 Georeferenced Photomosaic (*Photogrammetric*) Survey

A georeferenced photographic survey was conducted on a single cave site during PAS'14 to initially test the suitability of the technique for recording Peleliu's caves. The site selected was a large storage cave known to contain a remarkable assemblage of Japanese artillery caissons and limber carriages that had been documented by Denfeld during his survey (site 17) and revisited by UoA in 2010 (AB145). The photogrammetric survey method involved laying out a grid of numbered target markers approximately 2m apart across the floor area of the cave and then systematically photographing the cave floor from a constant height on a vertical plane. Each photograph required a 30% overlap with the previous image and at least two markers in frame. This precise and challenging task was undertaken by skilled photographer John Curry. The position of each target marker was measured using the Leica DISTO, fitted to a tripod, set up within the cave. This survey station was accurately tied in to a GPS coordinate, captured at the entrance, which allowed Universal Transverse Mercator (UTM) grid coordinates to be calculated for each of the targets.

Following field collection, the photographs were imported into a Geographical Information System (GIS) where the visible target markers in each image were assigned their relevant grid coordinates. By this process, each of the images was gradually stitched back together to form a photographic mosaic of the cave floor (Figure 10). As clearly illustrated in Appendix 5, this technique offered a remarkable level of clarity with the ability to analyze the complete cave floor assemblage in detail. The close proximity and three dimensional nature of the caissons and limbers at the rear of the cave proved problematic to maintaining the consistency of overlap, uniform distance from subject, and 90^{o} angle between floor and camera lens; this caused the considerable distortion and disjointed appearance of the mosaic in these areas of the cave. It was anticipated that these same factors would cause difficulties in smaller caves where lighting and mobility are more challenging and, as a result, the technique was not deployed elsewhere during the survey. Photomosaic survey continues to hold potential for accurately recording cave sites on Peleliu however, and further research may reveal a better suited solution to the unique challenges that the island's archeology continues to present.

Figure 10 - Conducting a georeferenced photomosaic survey of AB14-111 Storage Cave

Section 2. KOCOA Analysis

Terrain analysis is considered a core analytical component within US Army command and control doctrine. It is promoted to commanders and staff in conjunction with weather analysis as an *operational and mission variables* tool within the Physical Environment category that can contribute to the successful planning, preparation, execution and assessment of military operations (Dept. of the Army 2014: A-1). There are five military aspects of terrain which are analyzed to provide a broader understanding of the tactical environment of operations and these are referred to through the acronym of 'OAKOC': **O**bservation & fields of fire, **A**venues of approach, **K**ey & decisive terrain, **O**bstacles, **C**over & concealment (Dept. of the Army 2014: 10-5). The National Park Service's (NPS) American Battlefield Protection Program (ABPP) has made use of a derivative form of the official military terrain analysis system (termed 'OCOKA' or sometimes 'KOCOA') as a means of defining the boundaries of historic battlefield sites, assisting with land protection, preserving historic resources and scenes in addition to offering further insight into how man-made and natural features within the landscape contributed to the events and outcomes of past battles (NPS 2009: 243). Figure 11 provides a summary of the definitions prepared by ABPP for analyzing terrain features on historic battlefields and are listed in OCOKA sequence.

Terrain Aspect	ABPP Definition
Observation & Fields of Fire	*Observation:* The ability to see friendly & enemy forces & key aspects of terrain in order to judge strength, prevent surprise & respond to threats. *Field of Fire:* An area with direct line of sight that weapons may cover/fire upon effectively from a given position. Directly related to observation. *Dead Space:* Land within range of weapons that cannot be observed or fired upon.
Cover & Concealment	*Cover:* Protection against enemy fire both direct & indirect. *Concealment:* Protection from enemy observation & surveillance. Includes features that offer protection horizontally & vertically.
Obstacles	Natural or manmade terrain features that prevent, restrict, divert or delay military movement. There are two categories: existing & reinforcing. The presence & complexity of obstacles determines whether terrain is unrestricted, restricted or severely restricted.
Key & Decisive Terrain	*Key Terrain:* Any ground that must be controlled in order to achieve military success. Two factors determine key terrain: how a commander wishes to use it & whether the enemy can use it to defeat that commander's forces. *Decisive Terrain:* Ground that must be controlled in order to successfully accomplish a mission. Terrain is identified as such when the mission depends on its seizure.
Avenues of Approach/Withdrawal	*Approach:* Any relatively unobstructed ground that leads towards an objective or key terrain feature. *Withdrawal*: Any relatively unobstructed ground that leads away from an objective or key terrain feature. *Mobility Corridor*: An area where movement is channeled due to constricted terrain.

Figure 11 - NPS Military Terrain Analysis (OCOKA) Definitions (NPS 2009: 244-245)

A summary assessment of the Peleliu battlefield using the NPS military terrain analysis system was completed as part of the 2010 battlefield survey report (Knecht *et al* 2012: 13-21) under the sequence of KOCOA. In order to maintain consistency, this section will follow the same sequence but is not intended as a reiteration of the previous assessment. Instead, historic context is drawn from fresh sources, consulted during the archive research phase of PAS'14, and the analysis itself concentrates on the two areas of the battlefield surveyed as part of the 2014 project.

2.0 Historic Context

The invasion of the island of Peleliu by US armed forces in September 1944 formed part of a westward drive across the Pacific to occupy strategic islands in the Western Carolines, notably within the Palau group, codenamed 'Operation Stalemate'. Stalemate was the first operation to build on the swift successes of late 1943 in the Marshall and Solomon islands where a highly effective strategy of bypassing strongly held Japanese positions within the respective island groups had enabled an acceleration of the Pacific offensive (Hough 1950: 3). In keeping with this strategy, Admiral Nimitz, Commander in Chief Pacific Ocean Areas (CinCPOA), reduced the Palau element of the campaign so as to bypass Babelthuap, the largest island in the chain, which aerial reconnaissance and other intelligence gathering activities had revealed to be heavily fortified, strongly garrisoned and of minimal strategic value (Hough 1950: 11). The revision, designated 'Stalemate II' in July 1944, placed the emphasis of the Palau operation on the seizure of the southern islands; the Japanese constructed airfields on Angaur, Peleliu and Ngedebus, and this would prove beneficial to supporting future operations in the western Pacific and in an invasion of the Philippines (Smith 1996: 453).

Following the collapse of the outer line of defense and the strategic holds south of the Mandated Territory throughout 1943, Imperial Japanese General Headquarters redrew Japan's National Defense Zone creating a new line of resistance that made Palau strategically key as a communications and supply link between the Japanese home islands, the Philippines and the Marianas (MacArthur 1994: 225-228). By April 1944, the Palau garrison had been dramatically increased with the arrival of the experienced 14th Division, who had served with distinction in Manchuria, and defense construction was well underway (USAHEC 1946b: 1-3). Critically, the ardent fortification of the small, 2 mile wide by 6 mile long, island of Peleliu

took place under the cover of a dense jungle canopy which not only masked the complexity of the defenses to the US assault planning reconnaissance sorties but also the harsh, uncompromising terrain into which they were installed. Pre-invasion softening by US carrier based aircraft and strategic heavy bombers (in March, July, August, and between the 6th September and the assault on the 15th) only concentrated on targets that had been identified from aerial or submarine reconnaissance (Figure 12) and, as a result, caused few casualties amongst the highly disciplined defenders of the Japanese 2nd Infantry Regiment who were inconspicuously dug in amongst the coral (Hallas 1994: 37). The naval bombardment that joined the air attacks on the 10th of September was exactly the type of warfare that Lieutenant General Sadae Inoue, commander of the 14th Division, had planned against when issuing his defense construction directives at the beginning of 1944 (USAHEC 1946a: 1-3: 30) and, as such, the fire power of Western Gunfire Support Group TG 32.5 made little impact on the island's anti-invasion defenses ahead of the landings.

Figure 12 - A Vought OS2U Kingfisher from USS Pennsylvania directs naval gunnery during the pre-landing bombardment

At 08:32 on 15th September, armored LVT's of the US 3rd Amphibious Corps and 1st Marine Division rolled onto the south-western beaches of Peleliu codenamed White 1 & 2 and Orange 1-3. They were closely followed by amphibious LVTs and DUKWs carrying the men of the 1st, 5th and 7th Marine Regiments, 1st Marine Division, who had also struggled through the series of channels in the coral reef (cleared previously by underwater demolitions teams (NARA 22/09/1944)). A hail of artillery, mortar and small arms fire took a steady toll on the

assault waves as it tracked them from as far out as the reef edge (Camp 2011: 129-133). The 1st Marine Division's efforts to push inland and indeed even initially move off the beaches was severely hampered by the effective emplacement of large caliber artillery with supporting heavy machine guns on the flanks of the assault beaches. Here Colonel Nakagawa, the commander of the Imperial Japanese Army (IJA) 2nd Infantry Regiment and Peleliu sector units, had carefully followed Inoue's strategic defense instructions and sited his guns in well camouflaged concrete and coral positions where they could provide unobstructed and deadly enfilading fields of fire and thus "*annihilate the enemy landing forces on the beaches.*" (USAHEC 1946b: 12).

Observation was particularly crucial throughout the battle for Peleliu and played a significant role in dictating offensive objectives, troop movements, the scale of casualties sustained and the overall tactical impression of how the fighting was progressing. Unbeknown to the US assault planners, the central spine of Peleliu where Nakagawa coordinated his defense was a complex maze of steep ridges, high crests and rocky outcrops interconnected by exposed shoulders and separated by plunging narrow valleys. From these peaks the Imperial Japanese (IJ) forces held a commanding view of the low lying beaches, open airfield and approaches to any high ground, affording them the ability to direct fire onto the assaulting US Marines below from concealed and well supplied positions. At 300ft, one of the highest hills in the Omleblochel was naturally suited for this task and appears named in IJ sources Kansoku Yama (Observation Mountain). When Hill 300 (sometimes referred to as Old Baldy) was finally captured on 2nd November, a summit observation post (OP) reached only by ladders from the cave system within the hill was discovered (Hallas 1994: 265). The prisoner of war interrogation report of Corporal Ka Takahashi emphasizes the strategic value of the position further indicating that Nakagawa's principal command post lay within the hill (NARA 11/10/1944: 2).

Although holding the high ground proved very effective as the battle drew closer, forcing the US Marines and later Army to expose themselves to murderous gunfire, sources consulted at the USAHEC indicate that the distance between the observers in the ridges and the targets below affected accuracy of fire and information. Nakagawa's after action report to Inoue in Koror on 15th September describes two occasions where elements of the 1st Marine Division were seen to rout, once at 10:00 and later during a second attempted landing after 14:20

(USAHEC 1946b: 78). Although US accounts indicate that elements of 3rd Battalion (Bn), 1st Marine Regiment (Regt) were pinned down on the beach, near the Point and just inland of White 1 by 09:30 there is no supporting evidence from US sources for a full scale withdrawal (Hough 1950: 39). Units may have taken heavy casualties and been disorganized but they weren't beaten. What is apparent, however, is that accurate artillery fire had caused a critical shortage of amphibious transports (Figure 13) necessitating those that did survive to make repeated crossings between the 'transfer line', located beyond the coral reef, and the beach (Hough 1950: 37). One such return journey would have taken place from White 1 shortly after 09:45 following the disembarkation of 1st Bn, 1st Marine Regt (Garand and Strowbridge 1971: 110). It is therefore entirely likely that the withdrawals witnessed by IJ observers through the dense smoke, shrouding the beaches, were in fact the LVT's heading back to the transfer line to collect another wave of troops and supplies.

Figure 13 - Orange beach on D-Day: burning LVT transports contribute to the critical shortage in amphibious transport

Japanese misunderstandings of the tactical situation continued at dusk on the first day of the battle where the counterattack, across the airfield by tanks and infantry of the 14th Division Tank Unit, was reported to have inflicted a heavy blow (USAHEC 1946b: 78). Although the small force of seventeen Type 95 light tanks followed the pre-arranged attack plan and moved quickly across the open ground taking their opposition by surprise, the entire unit was destroyed almost as quickly as it had appeared. From the OP on Kansoku Yama, the tank unit

would have been observed as it moved down East Road before deploying and picking up pace to race south across the airfield, breaking through the Marine front lines and disappearing into the trees heading towards the forward command group of the 1st Bn, 5th Marine Regt (Gayle 1996: 13). It is likely that it was the imagined impact of *"such a cat-like spring"* (USAHEC 1946b: 78) piercing the enemy lines, rather than the reality of the maneuver's failure to inflict a major disruption to the Marine positions, that was eventually reported by Nakagawa to Inoue.

Fire accuracy also appears to have been impeded during the opening days of the assault where the vegetation, which had hidden the Japanese positions so well from pre-invasion bombardment, now offered concealment for the 5th and 7th Marine Regts spreading out south and east below the airfield (Gayle 1996: 19). The 5th Marine Regt set out en masse across the open ground of the airfield on D+1 and were subjected to very heavy fire from artillery and mortar positions in the southern ridges of the Omleblochel (Burgin 2011, McEnery 2012 & Sledge 2010). However, despite the intensity, this fire was indirect causing minimal casualties and ultimately proving ineffective at preventing the capture of the airfield, the primary defensive objective of the IJA's western and southern sector forces (USAHEC 1946b: 43).

Following the capture of the airfield and the areas south of the Omleblochel, the scheme of maneuver devised by Major General Rupertus (commanding general of the 1st Marine Division and the assault troops on Peleliu) called for the 1st Marine Division to maintain a steady south to north advance (Figure 14) up the island along a series of phase lines (Gayle 1996: 26). By adhering to this plan, Rupertus predicted that the capture of the island could be completed in three days; however, the plan failed to account for the harshness of the Omleblochel terrain and the complexity of the predominantly south facing defenses that Nakagawa had constructed within them. The result of continued daily orders of south to north assaults on fortified, near invisible, Japanese positions was exhaustion and mounting casualties for the 1st Marine Division. The situation failed to improve at night as Nakagawa employed guerrilla tactics, sending close quarter combat parties of 2-3 men to infiltrate US positions inflicting confusion and casualties (USAHEC 1946b: 80).

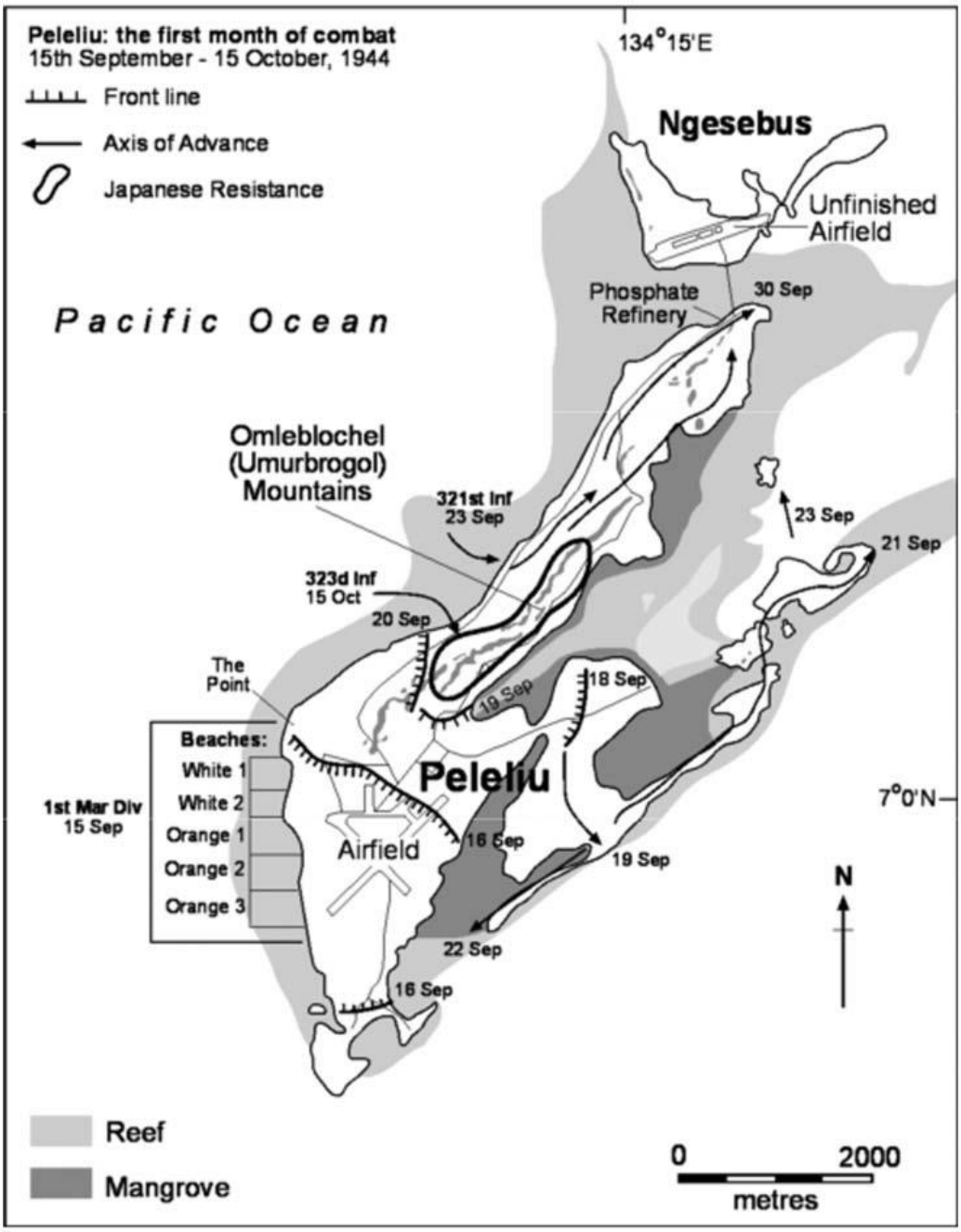


Figure 14 - Map showing the advance during the first month of the battle (Price and Knecht 2012: 10)

By the 21st of September, the 1st Marine Division had achieved a series of advances along the 200ft heights of the most southerly Omleblochel ridges denying the Japanese many of the crest observation positions required to maintain effective fire on the supply and logistics areas and the airfield (Gayle 1996: 21), but it came at a high price. Japanese reports throughout this period illustrate the persistence of the combined Marine infantry and tank attacks and the strength of the supporting artillery bombardments, yet ultimately note their failure to significantly alter the position of the front line (USAHEC 1946b: 81 & 98). The few Marines of the 1st Regt who lived through it were exhausted from attacking the same ground,

time and again, in blistering heat trying to maintain momentum. Russell Davis recalls: "*My fingers were smashed and burned, but I felt no pain. I crawled and scrambled forward and lay still, without any feeling towards any human thing.....I remember sitting by a roadside, in tears. I don't know why."* (Camp 2011: 274-275).

With the 1st Marine Regt in tatters and ordered to withdraw from Peleliu, support was sorely needed and it was the 321st Regimental Combat Team (RCT) of the 81st Infantry Division which provided the necessary men and equipment. Coming ashore on 23rd September, the 321st RCT made their way to the foot of West Road where they began a push northwards in an effort to bypass, and ultimately surround, the main Japanese area of resistance in the Omleblochel mountains (The 81st WDHC 1948: 135-138). The maneuver was made all the more pressing following the interception of a fleet of barges bringing reinforcements and supplies to the Peleliu garrison from the northern islands of Babelthuap and Koror on the evening of the 23rd (Gayle 1996: 26). Neither side missed the arrival of the opposition's reinforcements and the Japanese made particular note of the disembarking troops from Angaur and their subsequent push up West Road (USAHEC 1946b: 100). An increase in the apparent strength and aggressiveness of the American forces is also noted (*ibid.*) which most likely relates to the energy of the newly arrived Army troops and the impact that their presence had on morale and fighting spirit amongst the exhausted Marines.

Figure 15 - Minimizing exposure in a sniper's paradise

With dwindling supplies of large caliber ammunition and the increasing strength of US artillery controlled by aerial observers firing on any emplaced gun positions that revealed themselves, the IJ daytime fighting tactics began to make far greater use of mobile, infantry-deployed small arms weapons (*ibid.*: 81 & 100). Sniping proved particularly effective at inflicting casualties on the Army and Marine units moving up West Road and along the rugged raised ground to its immediate east (Figure 15) as attested to by Jim McEnery (2013: 248): *"The scariest part of all was how the bastards seemed to see us. It didn't take but a split second of exposure to draw their fire. Fifteen or twenty minutes would go by without a shot being fired. Then some Marine would make a bad move – and bam! – he'd be dead in his tracks."*

By dusk on the 26th September, the 321st RCT had succeeded in exploiting a narrow trail cutting west to east across the central spine of Peleliu and, after some fierce fighting for the summits of two hills dominating East Road, managed to drive a wedge between the Japanese forces in the north of Peleliu and what was now becoming known as the 'central combat zone' (CCZ) of the Omleblochel (USAHEC 1946c: Vol.2, Ch.2: 4-9). Japanese accounts record the movement of US forces northwards and that a significant battle had taken place, however, a lack of detail concerning events outside of the Omleblochel is apparent (USAHEC 1946b: 100). With the isolation of the CCZ, Japanese intelligence gathering was restricted and, in the days that followed, less and less information was getting through with accounts of the battle further north becoming increasingly vague as lines of communication were cut. By the 28th September, Nakagawa reported, in frustration to Inoue, that communications were not what he had hoped (*ibid.*: 103).

Whilst the Army had been striking out east, the 5th Marine Regt had passed through the treacherous sniping ground of Dead Man's Curve and the karst plateau and continued at speed up West Road where they encountered little resistance until they reached and began to assault the inverted T-shaped mountain range of the Chemiangel (termed Amiangal in wartime historical accounts). This was the northernmost ridge complex on Peleliu and, although equally well furnished with strongly fortified positions and steep towering peeks, it was isolated and lacked the depth that made the Omleblochel so impregnable (Gayle 1996: 29). As the 5th Marine Regt moved further up the western shoreline seeking to secure the Chemiangel, they were subjected to increasingly heavy fire from the small island of Ngedebus

(Hough 1950: 121-122). The 3rd Bn was tasked with seizing Ngedebus and undertook what is considered to be one of the most cost-effective single battalion operations in the Peleliu campaign and the first in the Pacific Theatre of Operations to be supported entirely by US Marine Corps aircraft (Gayle 1996: 31-33). With IJ fire on the airfield and beach areas slackening to sporadic harassment, the 33rd & 73rd US Navy 'Seabee' Construction Bns had brought the landing field back into operation and it was Vought Corsair's of VMF-114 that flew from here to provide close air support to the assault troops approaching Ngedebus (Figure 16). Accounts from both sides describe the ferocity and skill of the pilots who sufficiently stunned the defenders that when the 3rd Bn stepped ashore they met little-to-no resistance on the beach (Burgin 2011: 159, McEnery 2012:239 & Sledge 2010: 111). Pak Poku, a Korean member of the Japanese Navy Labor Corps, was working on the airstrip on Ngedebus at the time of the landings and recalled how frightening the pre-invasion bombardment was, but emphasized that the *"strafing caused most casualties of all"* (NARA 29/09/1944: 2).

Figure 16 - A close formation of Vought Corsairs from VMF-114 'beating-up' the field on Peleliu

As September turned into October, Angaur, Ngedebus and Peleliu were optimistically declared captured by Admiral Fort, Commander of Western Attack Force (Smith 1996: 549). The 5th Marine Regt was relieved on Ngedebus and in northern Peleliu by the 321st RCT who were tasked with 'mopping up' any remaining resistance in these 'secured' areas (Hough 1950: 127). Whilst the fight for the north was underway, the 7th Marine Regt had performed a holding action around the CCZ which was colloquially becoming known as 'Hell's Pocket'

and with US artillery concentrating its fire in the north for the Ngedebus landings, reduced pressure allowed Nakagawa to redeploy some of his 2nd Bn, 15th Regt units from their central southern positions to support the action in the north (USAHEC 1946b: 103). Losses continued to mount on both sides with few clear gains in the south, however, unknown to the US forces, Japanese optimism for a successful outcome was beginning to wain as they steadily became surrounded in the center of the island and their recently arrived reinforcements failed to make it through to the CCZ in strength (*ibid.*: 104).

Throughout the first half of October, Rupertus desperately tried to maintain the momentum and encourage the complete capture of the last pocket of resistance by the 1st Marine Division. Even with support from 3rd Bn, 5th Marine Regt, the Army's 710th Tank Bn, diversionary raids and coordinated battalion strength assaults from the north and the south, the 7th Marine Regt (who had been fighting in the pocket for over two weeks) continued to suffer heavy losses for few tenable gains and by the 5-6th October was withdrawn entirely from the front line and replaced by the 5th Marine Regt (Hough 1950: 154). Colonel Harris, commander of the 5th Marine Regt, was one of the few regimental commanders to make use of the Grasshopper tactical reconnaissance aircraft operating from Peleliu airfield to assess the terrain of the CCZ. His evaluation directly informed how he committed his regiment to the reduction of the pocket, opting to employ siege tactics and ceasing further frontal assaults from the south which proved so costly (Gayle 1996: 37).

The change in strategy was apparent to the IJ forces in their complex labyrinth of defensive cave positions and is commented on in the daily reports. Between the 1st and 6th October, the report entries are occupied with the frequent attacks of the 7th Marine units and offer positive accounts of resisting the flamethrowers, beating back the advances and inflicting casualties through successful close-combat night attacks (USAHEC 1946b:114-117). After the 6th October, the reports describe the enemy as "*not acting very fast*" (USAHEC 1946b:127). The entry for the 11th October is characteristic of this period and not only illustrates the change of pace in the fighting but also the close proximity between the front lines of the opposing forces - "*all through the day there were no heavy engagements with the enemy and our armies standing face to face*" (*ibid.*: 126).

As if a further indication of the change to siege tactics was needed, on the 8th October the Corsairs of VMF-114 began a different kind of combat sortie over the CCZ, swapping their 500lb and 1000lb bombs for external fuel drop-tanks filled with jellied gasoline, more commonly known as 'napalm'. The impact of a weapon that engulfed the target area in flame, sucked the air out of caves or burned the occupants to death (Daniel 2014: 87) was not lost on the Japanese who stated that the US forces plan appeared to be *"to burn down the central hills post to ashes*" (USAHEC 1946b: 118). Initial napalm drops appear to have had minimal impact on the Japanese positions and it has been suggested that the weapon's major contribution to the progression of the battle was the defoliation of the CCZ (Figure 17) which revealed cave entrances and exposed previously camouflaged strongpoints (Hallas 1994: 231). Later, an Army adaptation proved more effective and less dangerous for use in close proximity to US positions. Drop-tanks were jettisoned without igniters and did not detonate on landing allowing nearby friendly troops to withdraw to a safe distance and the gasoline to permeate through the porous rock into the caves below. After several hours had passed, the mixture was ignited by firing phosphorous mortar bombs into the target area (Blair and DeCioccio 2014: 182).

Figure 17 - The defoliated central combat zone, 12th October 1944

On the 12th of October, Major General Geiger, commanding general of the 3rd Amphibious Corps, declared the majority of the initial assault objectives met and the assault phase of the battle for Peleliu to be complete (The 81st WDHC 1948: 156). With the arrival of the 323rd RCT from Ulithi on the 14th, Geiger issued orders for the 5th Marine Regt to be relieved in the CCZ

and within two days the last Marines had withdrawn which effectively marked the end of Marine front line combat operations on Peleliu. Full command responsibility for continuing the siege passed from Geiger to Major General Mueller of the 81st Infantry Division on 20th October (*ibid.*: 166); however, it would be another month before Nakagawa's command post, in the heart of the Omleblochel, was finally overrun and Mueller could declare organized resistance on Peleliu at an end. The army troops settled down to a drawn out campaign of steadily clawing ground away from the IJ forces one ridge at a time.

Perhaps the most distinct difference between the Army's tactics and the Marines' was in the extensive use of sandbags to create cover where none existed and consolidate gains that had previously proved untenable (Figure 18). Digging defensive fighting positions had been a problem encountered in the baked rocky terrain of Peleliu since D-Day and until now the Army had followed the initiative of the Marines, using coral boulders and rubble to create cover to protect themselves. However, a number of failed attempts to hold key ridgetop ground in the face of Japanese counterattack and crossfire on the exposed summits led the Army to develop a different approach. Prior to their withdrawal with the 5th Marine Regt, the 4th Bn, 11th Marine Regt had demonstrated the effective use of sandbags by creating an emplacement for a 75mm pack howitzer on the crest of Hill 140 (Hough 1960: 160). The 321st and 323rd RCT decided to implement the strategy wholesale, going as far as to include it in published field orders (USAHEC 1946c: Vol.2, Ch.2: 35). A large advance on the 22nd October, the day following the issue of Field Order No.7, saw able bodied non-combatant personnel pressed into front line service to fill and then carry sandbags up to the attacking troops (*ibid.*).

The change in strategy warranted mention in the Nakagawa's reports to Inoue where he described how the enemy had advanced, constructed a sandbag position and then been able to fire an incessant mortar barrage on to his positions (USAHEC 1946b: 144). The defensive approach also proved effective against the nightly infiltration attacks of the Japanese close-combat teams which had, until now, been exacting a steady toll both in casualties sustained and mental strain: *"part of the enemy unit.....were observed strengthening their positions with sandbags and wire entanglements. Our Defense Unit attacked this enemy unit every night but to no avail"* (*ibid*.: 162).

Figure 18 - A sandbagged ridgetop position in the CCZ with 75mm Pack Howitzer (The 81st WDHC 1948: 342)

Armor had equally been identified early on in the battle as a key contributor to the success of assault actions and was employed extensively by the Army. Tanks offered much needed mobile fire support and a degree of protection for the advancing infantry (Committee14 1950: 107-108). At night, the infantry were able to return the favor by providing additional defense to the tanks and their crews from Japanese anti-tank close-combat teams (Committee14 1950: 110-111). The 710th Tank Bn also brought a few unexpected surprises to the battlefield. The 1st Platoon's M4A1 tanks were issued with E4-5 mechanized flame thrower apparatus which could be interchanged with, and mounted in place of, the bow machine gun by the assistant driver during combat (Dept. of the Army 1944: 4). The appearance of this sudden expansion to the US flame throwing capability evidently concerned the Japanese forces sufficiently to warrant mention in the action report for the 15th October (USAHEC 1946b: 128) where Lieutenant Gilbert Lindloff had led his platoon against caves north of the airport (Blair and DeCioccio 2014: 173). As the fighting moved deeper into the steep terrain of the Omleblochel, close tank support became limited by inaccessibility. The 306th Engineer Bn resolved this situation to a great extent by constructing roads into the upland areas using armored bulldozers (The 81st WDHC 1948: 183). As the fighting progressed, tracks were also successfully carved into Death Valley and Wildcat Bowl (*ibid*.: 191 & 193) and a ramp constructed in Wildcat Bowl (Figure 19) which enabled LVT flamethrowers and tanks to pour fire over the natural barrier of the China Wall into the caves at the heart of the Japanese defenses (*ibid*.: 199).

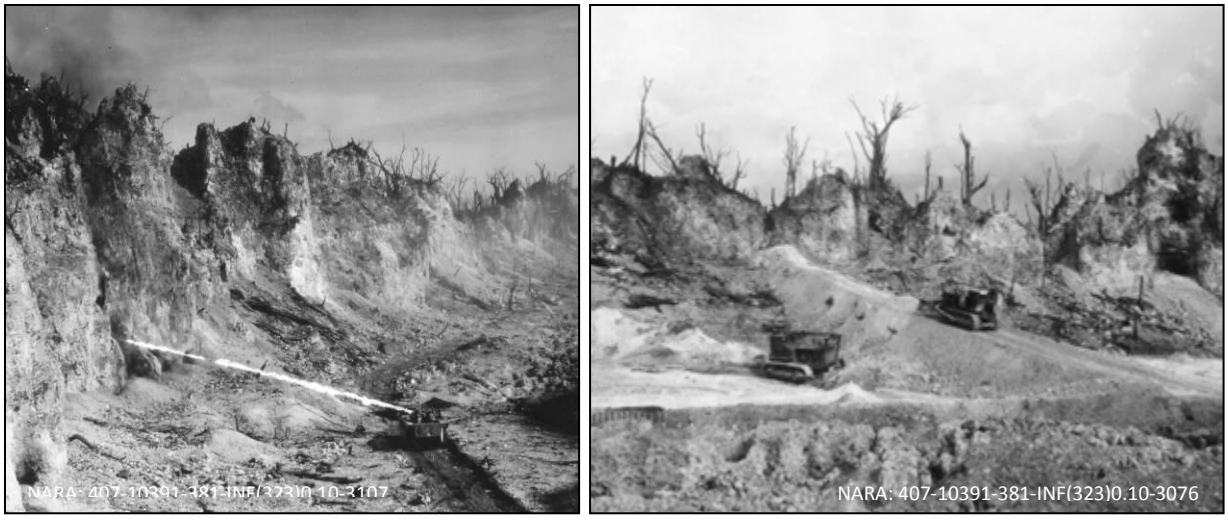


Figure 19 - Action in Wildcat Bowl: LVT flamethrower burning out caves (left) and armored bulldozers constructing the China Wall ramp (right)

At the beginning of November, Nakagawa reported soberly that fresh drinking water was running low and the ammunition ration, which had already been reduced by half, was not expected to last another 20 days (USAHEC 1946b: 162-163). Nightly infiltration operations continued; however, fewer and fewer reports of the outcomes were received as, one by one, the close-combat units failed to return (*ibid*.: 143). The final messages issued from the IJ command post reported intensive artillery and aerial bombardments followed by heavy infantry attacks as the 323rd RCT, supported by armor and flamethrowers took one rugged coralline limestone basin compartment at a time (*ibid*.: 177-178). On the morning of the 22nd November the IJ defense force was close to collapse but managed to hold out for a further two days (*ibid*.: 179). By the evening of the 24th, the regimental colors and documents had been burned, Major General Murai and Colonel Nakagawa had committed ritual suicide, and the surviving 56 men under Captain Nemoto had dispersed from their positions and formed 17 close-combat infiltration teams (*ibid*.: 179). Although sporadic engagements occurred throughout the rest of the month, organized resistance, and therefore the battle, was declared officially over at 11:00 on 27th November as four Companies of the 323rd RCT came face to face at the last Japanese command post in the heart of the Omleblochel (Blair and DeCioccio 2014: 236).

2.1 Area A

2.1.1 The Horseshoe/Mortimer Valley and Hill 100/Walt/Pope Ridge

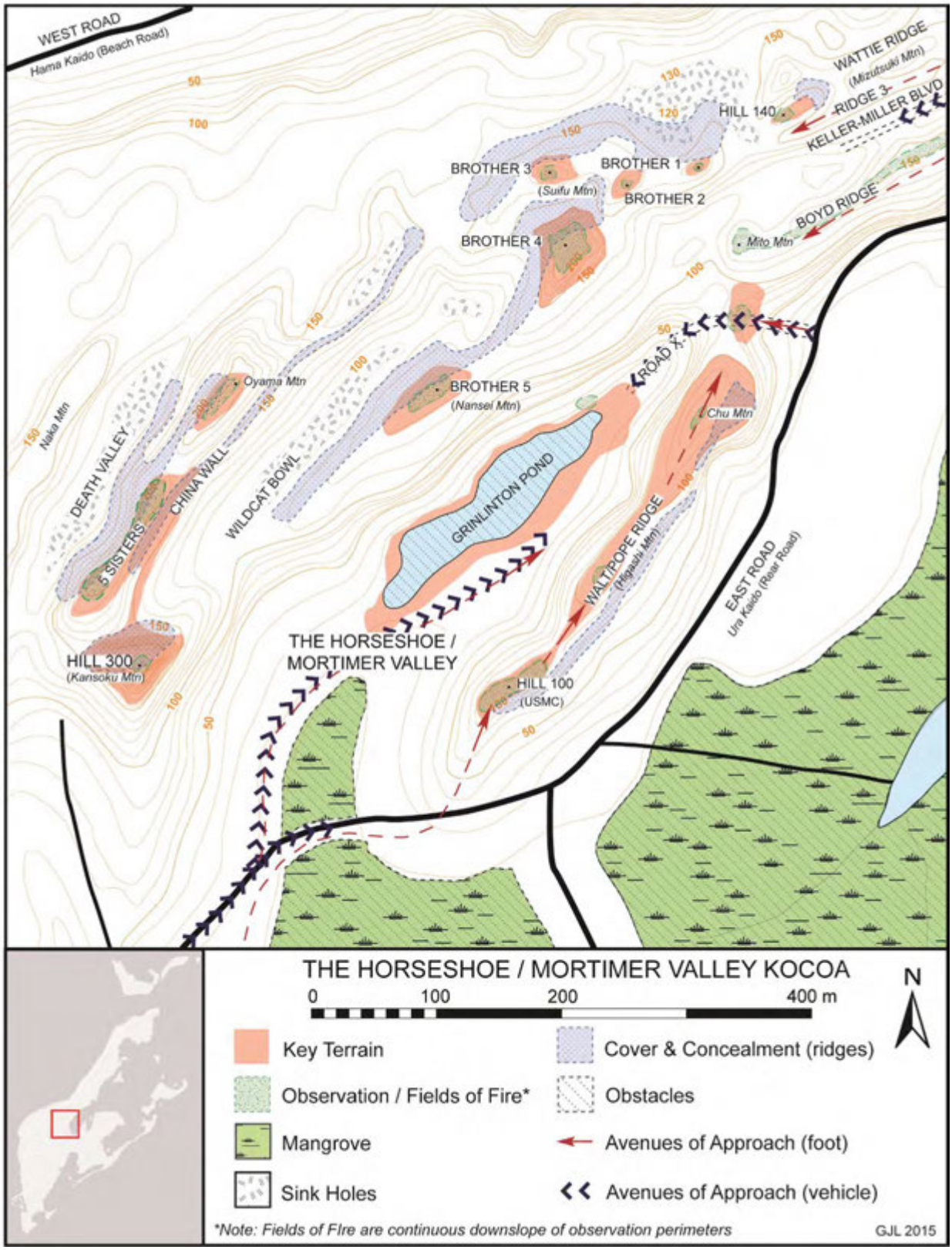


Figure 20 - KOCOA Map of The Horseshoe/Mortimer Valley

Roughly v-shaped in plan, the easternmost, lowest lying and largest of the valleys in the CCZ is most frequently referred to as 'The Horseshoe', which it was termed by the US Marine Corps; however, in late October 1944 it was renamed by the US Army to 'Mortimer Valley' (after Captain Joseph F. Mortimer, commanding officer of K *(King)* Company, 323rd RCT who was killed by sniper fire on 27th October 1944). The narrower northern end of the valley floor is predominantly occupied by Grinlinton Pond, an extensive sink hole retaining fresh water bordered on its eastern shore by a thin strip of shallow limestone sink holes. During the battle, swamp also extended into the mouth of the valley restricting movement across the entrance of the valley to a narrow causeway. The eastern side of the valley is formed by Walt/Pope Ridge, of some 100-130ft in height, with the western side consisting of a series of precipitous, 200ft coralline limestone peaks connected into a ridge known as the 5 Brothers. A low 100ft saddle opens to the west from Horseshoe/Mortimer Valley into Wildcat Bowl (the main valley of the CCZ) before rising up again to the south into Hill 300, a sharp pyramidal peak dominating the entrance into both valleys, referred to by the Imperial Japanese forces as 'Kansoku Yama' (Observation Mountain).

Terrain Feature	**KOCOA Aspect**	**Reason**
5 Brothers (crests)	Key Terrain, Observation, Field of Fire	Holding the heights was key to both sides for offensive & defensive actions • Elevated positions allowed unobstructed views & delivery of direct small arms fire on exposed hostile forces
5 Sisters (crests)	Key Terrain, Observation, Field of Fire	Holding the heights was key to both sides for offensive and defensive actions • Elevated positions provided unobstructed views of mouth of valley & enabled delivery of direct small arms fire on advancing hostile forces
Boyd Ridge	Key Terrain, Observation, Field of Fire	Observation of troop movements, direction of ranged fire & delivery of direct fire on hostile forces/positions below • Provided covering fire for friendly US units advancing along Road X
	Avenue of Approach	Ridgeline allowed movement of infantry squads at height between defense positions • US Army used ridge to advance south towards valley
Causeway	Obstacle	Restricted/funneled vehicles into anti-tank gun field of fire • 2 US tanks slipped off sides blocking route to further mechanized transport
	Avenue of Approach	Only available route from south to start of East Road without fully entering the valley • Infantry approach for ascent and retreat from Hill 100
East Road	Avenue of Approach	Main thoroughfare for troop movement on east side of CCZ • Fed advancing armor & infantry columns onto improvised routeways

Grinlinton Pond	Key Terrain	Only large natural source of fresh water for IJ forces following creation of the pocket
	Obstacle	Restricted/funneled movement of tanks & flame throwers to east side of valley floor creating choke points & killing zones
Hill 100, Walt/Pope Ridge	Decisive Terrain	The ridge had to be held in order to complete the full encirclement of the main IJ defense forces in the Omleblochel • Created the eastern perimeter of 'the pocket' and secured the flank of the US advance from the north
	Key Terrain, Observation, Field of Fire,	Elevated position allowed unobstructed view, direction of ranged fire & delivery of direct fire on hostile forces/positions within valley and on elevated terrain opposite • Provided covering fire for friendly forces operating below
	Avenue of Approach	Route taken by US Infantry advancing on key & decisive terrain along ridgeline
Hill 140	Key Terrain	Allowed direct fire to be place on IJ fortified positions in the sides of Brothers 1-3 • Reduced IJ concealment on reverse slopes of Brothers 1-3 • Intercepted IJ counterattacking forces approaching the valley from north-west
Hill 300 (Old Baldy)	Decisive Terrain	Controlled entrance to IJ core defense area • Had to be taken to secure airfield objective against indirect fire
	Key Terrain, Observation, Field of Fire	Known as 'Kansoku Yama' (Observation Mountain), served as primary IJ post for observing US activity & coordinating ranged fire • Commanding views across approaches to valley, Wildcat Bowl & entire south of island • Enabled delivery of direct small arms fire on advancing hostile forces from elevated, concealed positions in & on top of hill
Horseshoe/Mortimer Valley Floor	Observation	Portable illumination system established by 321st RCT to defend against night infiltration
	Field of Fire	Relatively flat, narrow base that could be swept with small arms & artillery fire from concealed positions along valley sides • Exposed to indirect fire from overlooking ridgetops • Clear arcs of fire for mobile artillery, armor & flame throwers moving through valley
	Avenue of Approach	US armor supported by infantry advanced & withdrew through valley from south and north upon completion of Road X
Horseshoe/Mortimer Valley Sides	Cover & Concealment (caves)	Multitude of natural & augmented caves dug into valley sides provided shelter for IJ infantry • Supported by camouflaged strong points, pillboxes & dugouts • Included hidden machine gun, mortar & artillery positions
Keller-Miller Boulevard	Avenue of Approach	A bulldozed, improvised routeway cutting west from East Road before turning southwest parallel to Boyd Ridge • Supported US infantry

Keller-Miller Boulevard cont'd	Avenue of Approach cont'd	advance south by creating access for tanks and LVT flamethrowers to fire at hostile positions in box canyon complex at north end of valley
Road X	Avenue of Approach	A bulldozed, improvised routeway cutting west from East Road • Significantly contributed to US forces seizing & holding the valley • Supported US infantry advance south & west by creating access for tanks, LVT flamethrowers and field artillery into north end of valley
Saddle between Walt / Pope Ridge & Boyd Ridge	Key Terrain, Observation, Field of Fire	A natural, relatively large & flat plateau providing wide field of fire towards 5 Brothers, west side of valley & Hill 300 • Two US 37mm anti-tank guns positioned here provided key fire support for units advancing through the valley and up the 5 Brothers ridge
Swamp	Obstacle	Restricted/funneled movement of advancing armor and infantry at mouth of valley
Upper east slope of Hill 100, Walt/Pope Ridge	Cover & Concealment (ridges)	Concealed US forces from observation and protected against direct fire from the west
Upper west slope of 5 Sisters & China Wall	Cover & Concealment (ridges)	Provided horizontal concealment to IJ forces from observation and direct fire from east
Upper west slope of Hill 300	Cover & Concealment (ridges)	Provided horizontal concealment to IJ forces from observation and direct fire from east
Upper west & north slopes of 5 Brothers	Cover & Concealment (ridges)	Provided horizontal concealment to IJ forces from observation and direct fire from east

2.1.2 321st Infantry Trail and Hill B

Unlike the CCZ, the area around the 321st Infantry Trail was subjected to far less artillery and naval gunfire prior to and following the landings on Peleliu. As a result, the jungle vegetation that covered this area remained dense. This contributed significantly to the style of fighting that took place here: restricting close air and mechanized support, shortening lines of sight and interrupting fields of fire (Committee14 1950: 61, 65 & Appendix 1 v-vi). The westernmost 350m of the 321st Infantry Trail crossed a flat coastal plain that was partially sheltered by a low lying ridge which ran parallel to West Road. Crossing this ridge, the Trail traversed a flat 100m gap, wound through a narrow pass between Hill 100 and the southernmost ridge of what US forces termed the 'Kamilianlul Mountain Range' and then exited onto East Road. At around 120ft in height, Hill 100 dominated the central section of the Trail and loomed up steeply between a gentler ridge on its north side and a steep sided, wide and flat topped ridge that wound its way down towards the CCZ to the south. It presented very steep slopes on all sides, except for the south, where it connected across a narrow shoulder to what has been termed the 'South 100 Escarpment'. Hill B is the highest point in this area at 210ft and formed a formidable terrain feature. The hill is tightly bounded by mangrove swamp on the east and sits parallel to East Road with highly precipitous sides

and a long narrow crest. Along with the ridges of the southern Kamilianlul and South 100 Escarpment, Hill B formed a narrow gorge only 25m wide through which any vehicles travelling north-south along East Road had to pass.

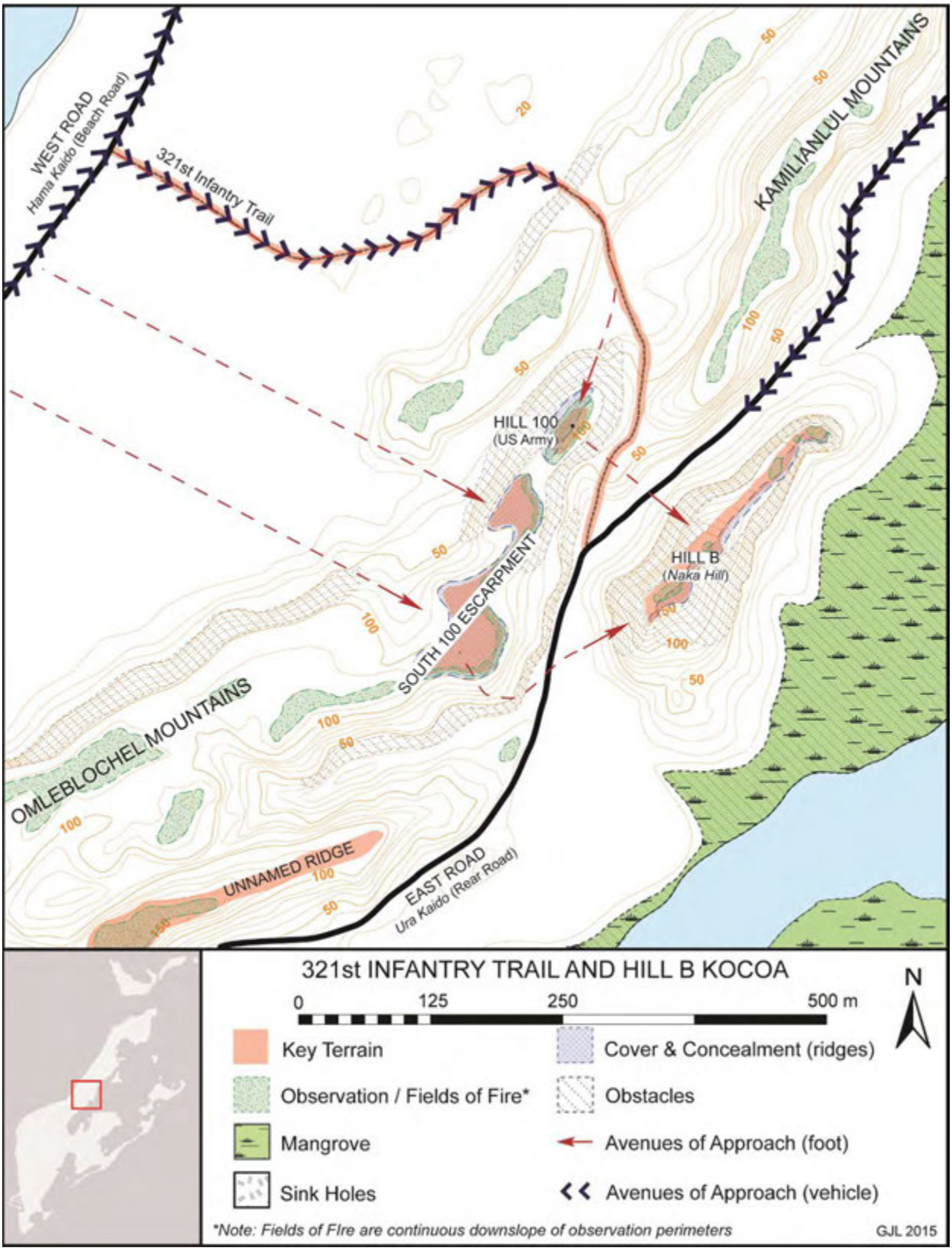


Figure 21 - KOCOA Map of 321st Infantry Trail and Hill B Area

Terrain Feature	KOCOA Aspect	Reason
321st Infantry Trail	Decisive Terrain	Control of the trail was critical to cutting off IJ forces in the Omleblochel from potential reinforcement from the north
	Avenue of Approach	Native trail later enhanced by armored bulldozers • Used by 321st RCT to advance on Hill 100 & Hill B • Used by US army support units to evacuate wounded & deliver supplies to frontlines • used by IJ troops for counterattacks on Hill 100 & infiltration
East Road	Avenue of Approach	Main thoroughfare for troop movement on east side of CCZ • Fed advancing armor & infantry columns onto improvised routeways
Hill 100 (slopes)	Obstacle	Very steep limiting movement & slowing assault on hilltop positions • Exposed attackers to fire from above with minimal cover • Improvised ladders & scrambling required by US troops to overcome obstacle • Terrain prevented close armor/flame thrower support
Hill 100 (summit)	Key Terrain	Elevated central position meant hill controlled movement along 321st Trail • Launch point for further drive east & attack on Hill B
	Observation, Field of Fire	Offered commanding views across Trail and nearby terrain • Enabled direction of ranged fire & delivery of direct fire on hostile forces/positions along Trail • Provided covering fire for friendly forces operating below
	Cover & Concealment	E Company, 2nd Bn, 321st RCT enhanced terrain cover with construction of defensive fighting positions • Central summit area protected against observation & direct fire from below
Hill B (slopes)	Cover & Concealment	Natural & augmented caves dug into hill sides & base provided shelter for IJ infantry & storage of supplies • Included hidden machine gun positions & ammo dumps
	Obstacle	Steep sides limiting movement & slowed assaults made on hilltop positions • Exposed attackers to fire from above & offered minimal cover • Limited close armor/flame thrower support
Hill B (summit)	Decisive Terrain	Heights dominated the East Road and the east end of 321st Trail • Critical to IJ forces for keeping supply & communications routes open to the north • Critical to US forces to control movement along East Road, secure 321st Trail & complete encirclement of IJ forces in the Omleblochel
	Key Terrain	Elevated position meant hill controlled movement along 321st Trail & East Road • Launch point for advancing south & north
	Observation, Field of Fire	Offered commanding views across Trail and nearby terrain • Enabled direction of ranged fire & delivery of direct fire on hostile forces/positions along Trail, East Road &

Hill B (summit) cont'd	Observation, Field of Fire cont'd	Unnamed Ridge • Provided covering fire for friendly forces operating below
	Cover & Concealment	Central spinal crest formed natural firing parapet, offered protection from observation & flat trajectory weapons to the west & enabled movement along length of summit
South 100 Escarpment	Key Terrain	Elevated 100ft high plateau to immediate south of strategic Hill 100 • Protected vulnerable south flank of Hill 100 • Strategic promontory at end of a north-south aligned ridge supporting defense of or future advances into the Omleblochel • Strong defensive position
	Observation, Field of Fire	High ground with good views across to Hill 100, East Road & Hill B to monitor movement • Contributed to interlocking flat trajectory fire from other positions covering East Road • Enabled direction of ranged fire on hostile forces/positions
	Cover & Concealment	I Company, 3rd Bn, 321st RCT enhanced terrain cover with construction of defensive fighting positions • Flat central summit area protected against observation & direct fire from below
	Obstacles	Steep slopes restricted movement, slowed assaults made on hilltop positions & forced attackers to employ alternative tactics • Exposed attackers to fire from above & offered minimal cover • Prevented close armor or mechanized flame thrower support
South 100 Escarpment (inner slope)	Cover & Concealment	Natural bowl offering horizontal concealment on three sides • Natural & augmented caves dug into bowl provided shelter for IJ infantry
Other Ridges	Observation, Field of Fire	High ground offering potential views through dense vegetation to monitor movements and fire on advancing hostile units
Unnamed Ridge	Key Terrain	Elevated position • North-south aligned ridge allowed movement of troops at height • Overlooked East Road (key avenue of approach)
	Observation, Field of Fire	Height offered views through thick vegetation along section of East Road • Enabled monitoring of movement, direction of ranged fire and deployment of flat trajectory weapons on Hill B & hostile traffic along East Road
	Cover & Concealment	Natural & augmented caves dug into lower slopes & base provided shelter for IJ infantry & storage of supplies • Included hidden machine gun positions
West Road	Avenue of Approach	Main thoroughfare for US movement up west shore • Fed troops onto 321st Trail • Provided routeway for Task Force Neal to connect to East Road at RJ15 and support attack on Hill B

2.2 Area B

2.2.1 Chemiangel Mountains, Hill Row and Radar Hill

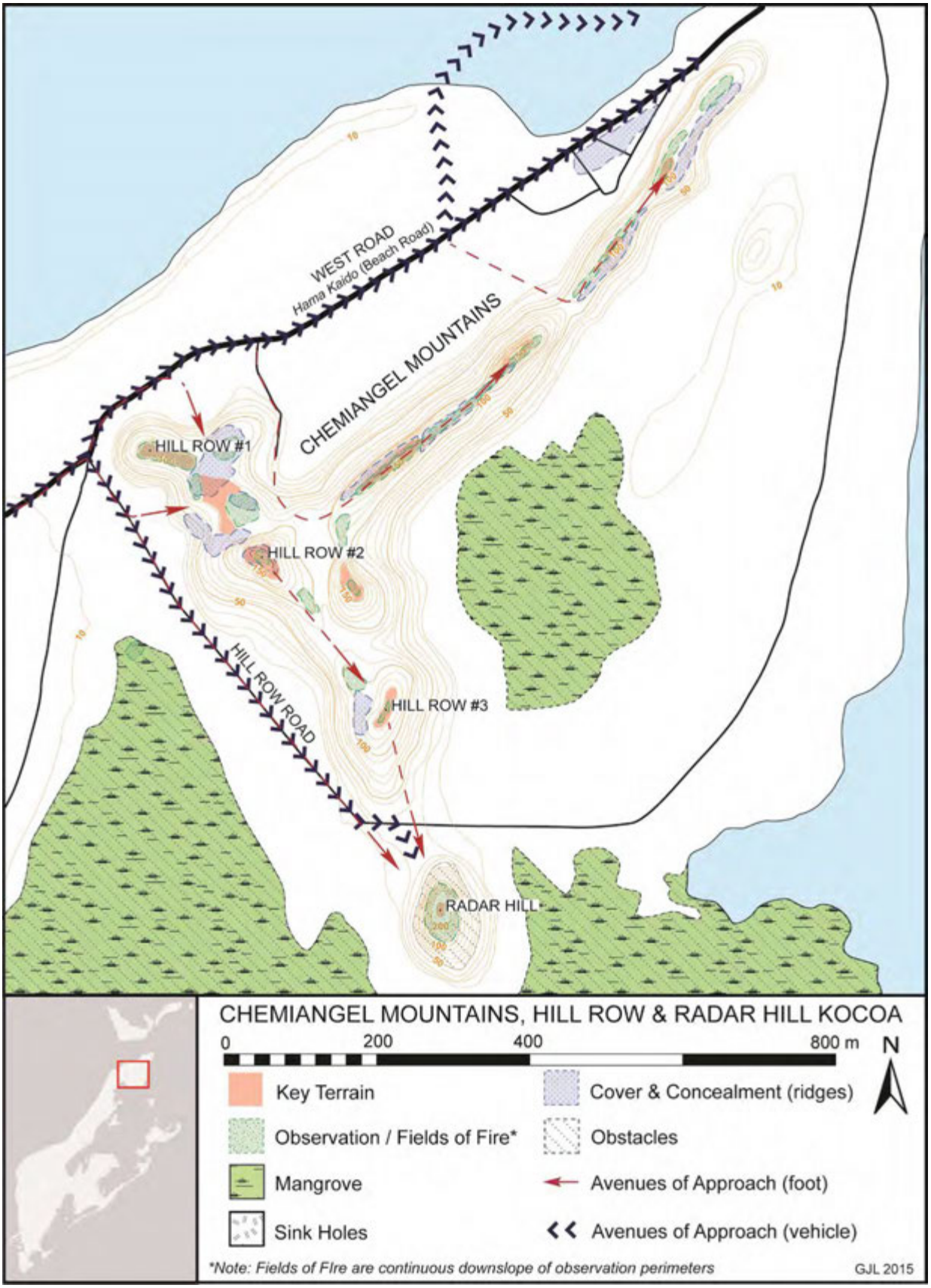


Figure 22 - KOCOA Map of Chemiangel Mountains, Hill Row and Radar Hill Area

Similar to the 321st Infantry Trail area, the Chemiangel ridge system didn't sustain as much aerial or naval bombardment damage as the Omleblochel. Key targets in northern Peleliu, such as the radio station (c.300m south-west of Hill Row #1) and the radio direction finding apparatus on the top of Radar Hill, were successfully bombed and strafed during the pre-invasion phase of Operation Stalemate II, but, for the best part, the jungle vegetation that masked the jagged terrain and fortified positions within the Chemiangel itself remained dense and unaffected. The Chemiangel range is roughly an inverted T-shape in plan and exhibits the same combination of exposed towering hilltops and precipitous ridges as the Omleblochel; however, it lacks the layered depth of ridges of the southern range. The key north-west to south-east heights of Hill Row (100, 160 & 130ft high) and Radar Hill (210ft high) stand in relative isolation and this factor significantly contributed to their demise as each could be assaulted separately with the attackers receiving only minimal flanking fire from the nearby heights (Gayle 1996: 29). Each of these hill tops share similar characteristics of steep, uncompromising sides leading to a roughly conical top with Hill Row #1 & 3 having the largest and flattest oval summit areas. Hill Row #2 guards the southern and gentlest ascent onto the Chemiangel ridge line, a very narrow single ridge of four distinct summits with excellent 360° observation connected by rounded arête shoulders which considerably shorten lines of sight and interrupt fields of fire along the length of the ridge.

Terrain Feature	KOCOA Aspect	Reason
Chemiangel Ridge	Key Terrain, Observation	Elevated heights offered panoramic views, particularly north towards Ngedebus • Extensive sea views allowed observation of sea traffic/movement of hostile naval forces • Monitoring of US assault on Ngedebus • direction of counterbattery fire on IJ Ngedebus positions
	Cover & Concealment	Dense vegetation aided vertical concealment • Undulating ridge crests enhanced with improvised rock shelters offered horizontal protection • Natural & enhanced caves with camouflaged entrances shelters IJ units
	Avenue of Approach	Route taken by US Infantry advancing on key terrain & observation posts along ridgeline
Chemiangel Ridge (slopes)	Observation, Field of Fire	Natural & enhanced complex cave systems with multiple entrances & firing/observation ports dug into sides & base of ridge • Interlocking field of fire covered northern West Road, approaches to strongpoints & command positions

Chemiangel Ridge (slopes) cont'd	Cover & Concealment	Multitude of natural & augmented caves provided shelter for IJ infantry & supplies • Supported by camouflaged strong points & pillboxes • Included hidden machine gun, mortar & artillery positions
Hill Row #1	Decisive Terrain	Formed key 'corner stone' anchoring defenses of Hill Row & entire Chemiangel range from any attack made from south • Controlled access to northern point of Peleliu & approaches to Ngedebus • Had to be taken to secure northern Peleliu
	Key Terrain	Elevated position meant hill dominated surrounding low lying terrain & West Road pinch point • Concentration of emplaced IJ field artillery, notably anti-tank guns
	Observation, Field of Fire	Mostly unrestricted, commanding views across approaches to Hill Row & Chemiangel • Enabled adjustment of artillery & delivery of direct flat trajectory weapons fire on advancing hostile forces from elevated, concealed positions in & on top of hill • Could fire onto approaching hostile forces from most directions • Interlocked fire with Hill #2 to create killing zone down shoulder between hills
	Cover & Concealment	Some of the most complex natural & augmented caves encountered on Peleliu dug into hill with multitude of openings providing shelter for IJ infantry, ammunition & supplies • Included hidden machine gun, mortar & artillery positions • Caves & vegetation afforded protected against vertical/aerial observation & direct fire from below
Hill Row #2	Key Terrain	Elevated position higher than Hill Row #1 & 3 controlling access to foot of central Chemiangel ridgeline & potential IJ reinforcement route
	Observation, Field of Fire	Clear views across southern central Chemiangel ridgeline • Broad, flat summit offered excellent US Company size position for laying down base of fire on Hill #1 & supporting further assaults on strong points • Enabled monitoring of hostile troop movements • Direction of ranged fire & delivery of direct fire on surrounding hostile forces/positions • Provided covering fire for friendly forces operating below
	Cover & Concealment	3rd Marine Regt enhanced terrain cover with construction of defensive fighting positions on summit • Flat central summit area protected against horizontal observation & direct fire from below • Natural & augmented caves provided shelter for IJ infantry

Hill Row #3	Key Terrain	Elevated position holding right flank of Hill Row • Provided mutual support for Radar Hill strong point • Covered potential access route to foot of central Chemiangel ridgeline
	Observation, Field of Fire	High ground with good views across to Hill Row #2, Hill Row Road & Radar Hill to monitor movement • Contributed to interlocking flat trajectory fire from Radar Hill positions covering Hill Row Road • Enabled direction of ranged fire & deployment of direct small arms fire on hostile forces/positions
	Cover & Concealment	Natural & augmented caves provided shelter for IJ infantry • Supported by improvised defensive fighting positions using natural defiles & terraces in hill sides
Hill Row Road	Avenue of Approach	Access route for US infantry, armor, artillery & support vehicles along base of Hill Row • Provided armor & LVT flamethrower access to Radar Hill
Ocean (between Ngedebus & Peleliu)	Avenue of Approach	Used to maneuver armored LVTs into positions where they could fire on cave complex & supporting strong points on west side of Chemiangel ridge which were halting advancing land based units
Radar Hill	Decisive Terrain	Steep elevated position summit • Concentration of IJ resistance • Had to be taken to secure northern Peleliu
	Key Terrain	Isolated conical hill with commanding, unobstructed views across entirety of Peleliu
	Observation, Field of Fire	High ground offered views through vegetation to monitor movements along Hill Row hills & road, Radio Station and West Road junction • Allowed deployment of flat trajectory weapons to fire across broad fields of fire along main avenues of approach to hill • Views facilitated direction of ranged fire over large area
	Cover & Concealment	Honeycombed with natural & augmented caves dug into slopes which provided shelter for IJ infantry, storage of supplies & ammunition • Included hidden machine gun positions
	Obstacle	Very steep sides limited movement & slowed assault on hilltop • Exposed attackers to fire from above with minimal cover
Shoulder between Hill Row #1 & 2	Key Terrain	Provides shallower gradient access to hill crests • One of two possible approaches to foot of central Chemiangel ridgeline • Valuable narrow 'draw' for IJ defense reducing width of attackers front
	Field of Fire	Deadly crossfire from concealed strong points including anti-tank gun positions in sides of Hill Row #1 & 2 • Natural narrowing funneled attacking forces into a killing zone swept with small arms & larger caliber flat trajectory fire

Shoulder between Hill Row #1 & 2 cont'd	Avenue of Approach	US infantry route of advance used to flank heavily fortified positions on Hill Row #1
Shoulder between Hill Row #2 & 3	Field of Fire	Interlocking crossfire from concealed cave positions in sides of Hill Row #2 & 3 • Used by US to position heavy artillery which could fire on Hill Row & Radar Hill IJ positions
Swamp	Obstacle	Restricted movement of advancing armor and infantry to established routeways covered by anti-tank weapons & concealed machine guns
West Road	Avenue of Approach	Main thoroughfare for movement up west shore • Fed US infantry, armor, artillery & support vehicles onto Hill Row Road • Main marshalling routeway for US land forces assaulting Ngedebus • Main line of advance/withdrawal for units operating in northern Chemiangel ridges

Section 3. Areas Surveyed

The Scope of Work issued by PWHS designated two study areas within the Peleliu battlefield that were to be archeologically surveyed. Area A covered a long, narrow region of the eastern Omleblochel extending from The Horseshoe/Mortimer Valley in the south to just north of the estimated location of the 321st Infantry Trail, some 280 acres. Area B consisted of a 400 acre zone in northern Peleliu which took in the full extent of the Chemiangel Mountains. Site and artifact distribution in both areas was found to be denser than anticipated, the low level undergrowth very thick and the rugged terrain tough going. In total, PAS'14 covered 49 acres in Area A and recorded 95 individual sites and 104 artifact assemblages. 61 sites and 2 artifact assemblages were recorded across 46 acres in Area B. The following subsections offer summary descriptions and interpretations of the sites and artifacts recorded during the 2014 archeological survey with associated historical context provided where appropriate. The sites are organized numerically and by area with specific location data only provided in **Appendices 1 & 2 (Special)**; core site descriptive data is written, where appropriate, in shorthand to abbreviate communication.

3.0 Area A

3.0.1 Pre-Battle Sites

PAS'14 Site #	Site Description
AB14-001	Palauan Shell Midden
AB14-002	Palauan Shell Midden
AB14-003	TBM-1C Avenger 16956 Crash Site
AB14-008	TBM-1C Avenger 16956 Port Wing Aileron
AB14-014	Palauan Shell Midden
AB14-020	Palauan Shell Midden
AB14-035	Phosphate Mining Pit
AB14-039B	Narrow Ledge Railway Cutting & Track
AB14-047	Narrow Ledge Railway Cutting & Track
AB14-049	Palauan Shell Midden

AB14-001 Palauan Shell Midden

Whilst conducting an initial visual reconnaissance of The Horseshoe/Mortimer Valley area to determine walkover survey traverse routes, a spread of burnt shell, charcoal and sherds of Palauan coarseware pottery was identified on the lower southern plateau of Hill 300. The spread was also found to contain later intrusions of shrapnel (Figure 23), some of which were identifiable as originating from large caliber US naval ordnance, and small sherds of fine, white-glaze china. The visible extent of the midden was narrow, at c.5m long and 3m wide,

however, it likely extends further under the leaf litter and undergrowth. Although the midden is most likely pre-contact in date, it may also be associated with later native Palauan settlement activity related to the village of Ngesias, the second of the five *beluu* of Peleliu, which held territorial control over the area in which the midden is located (Murray 2006:74-75). Evidence of hunting, gathering and agricultural activities taking place in the south-eastern Omleblochel as well as a stone path across the mountains to Ngerchol are present in oral historical accounts (*ibid*.) indicating that the upland areas formed an active and integral part of Palauan life.

Figure 23 - AB14-001 Palauan Shell Midden: context & detail

AB14-002 Palauan Shell Midden

During the initial ascent up the southwest slope of what remains of Hill 100, a very extensive spread of Palauan midden material was identified which appeared to have eroded down into The Horseshoe/Mortimer Valley from the ridge top. Further spreads of midden material of a similar nature were found to extend along the full length of Walt/Pope Ridge and separate GPS coordinates numbered B-D were taken at concentrations made visible through undergrowth clearings and recent tree throws. All concentrations were found to include burnt and unburnt *Strombus gibberulus* and *Atactodea striata* mollusc shells, which are dominant food shells found in Peleliu & Rock Island middens (Liston 2005: 300). Concentration D also contained disarticulated pig long bones, a giant clam shell (*Tridacna gigas*) and an intruded US .50 caliber expended cartridge case.

Sherds of Palauan pottery were noted throughout all concentrations, varying in size and form but with similar unglazed, unevenly smoothed surfaces and no apparently deliberate decoration. Coil junctions were most clearly visible on the larger rim sherds demonstrating the construction method employed. Most of the sherds were either red/brown with a grey core or grey/black with red/brown margins suggesting a short firing. Visible rim sherds were predominantly plain or slightly flattened with profiles indicating straight-sided or slightly inverted bucket-shaped vessels; however, several of the larger sherds exhibited broad lipped rims and an out-turned bowl profile that is more synonymous with large storage or cooking vessels (Figure 24). The pottery was most likely imported at time of use from volcanic geology islands such as Babelthuap (Reepmeyer *et al.* 2011: 90) which are understood to be the only sources of clay for pottery manufacture in the Palau archipelago (Snyder *et al.* 2011: 160). Given its elevated and visually prominent position on the Walt/Pope ridgeline as well as the close proximity to coastal resources, it is possible that this expansive area of midden may indicate the presence of pre-Stonework Era (pre 1000 AD) settlement. Referred to as the Terrace Era (Liston and Tuggle 2006: 151) or Earthwork Village Period (Snyder *et al.* 2011: 165), settlement has been found on similar low hillsides or narrow ridgelines with associated dense midden deposits elsewhere in Palau, the terrain offering both practical defense and a means of demonstrating status (Liston and Tuggle 2006: 151). Samples from the midden deposits surrounding AB14-003, recovered during the 2005 excavation, yielded a ^{14}C radiocarbon date of 1500BP (c. 500 BC). This date would place the midden spreads atop the ridge at the beginning of the Terrace Era/Earthwork Village Period making it indicative of some of Peleliu's earliest settlement activity.

Figure 24 - AB14-002 Palauan Shell Midden: large rim sherd at A and main assemblage at C

AB14-014 Palauan Shell Midden

A large area of burnt shell and Palauan coarseware pottery sherds visible through a clearing in the undergrowth towards the northern end of The Horseshoe/Mortimer Valley basin. Similar in nature to previously recorded midden deposits AB14-001 & 2 and therefore likely to be of a similar date and provenance.

AB14-020 Palauan Shell Midden

Spread of exposed midden deposits across the central area of The Horseshoe/Mortimer Valley basin. This location is noteworthy for the presence of the distal end of a human tibia which was found amongst the unburnt shell and pottery sherds. Otherwise this midden was similar in nature to other deposits within this area and may even be an extension of AB14-014 which centers only 80m to the north-east of this position.

AB14-049 Palauan Shell Midden

A narrow strip of exposed midden material extending for 5.34m along the foot of a vertical cliff face of southern Hill 300. Concreted shell and large pottery sherds are also visible protruding from the slightly looser lower section of the cliff face. This material may represent the remnants of a larger deposit that once occupied the floor of a rock shelter or cave at the base of the cliff face which has subsequently been destroyed through phosphate mining or battle related destructive processes. Pottery fragments are analogous with those from AB14-001, 34m upslope to the west, and other pre-contact Palauan shell midden spreads encountered within this area.

AB14-035 Phosphate Mining Pit

A vertical sided 3m square pit of 3.37m in depth that has been partially infilled with rubble debris and overgrown with jungle vegetation (Figure 25). A bullet riddled metal storage drum is visible at the bottom of the pit and sections of narrow gauge railway track protrude from the opening onto the surface. The pit is likely associated with phosphate mining activities and may have served as a testing pit to examine the quality of the phosphate deposits in this area. There may be horizontal passageways leading off this central shaft which are obscured from view by the fallen debris and vegetation.

Figure 25 - AB14-035 Phosphate Mining Pit

AB14-039B Narrow Ledge Railway Cutting and Track

A narrow, level gradient trail extending along the western side of The Horseshoe/Mortimer Valley with a single narrow gauge rail in evidence. Large sections of the ledge cutting have been blast-eroded by ordnance. This is likely the remains of a pre-battle narrow gauge railway line associated with phosphate extraction activities (Figure 26). The line may later have been reused to install large caliber artillery in caves and supply ammunition to them or simply as a trail for IJ infantry to move between defensive fighting positions unobserved. Further lengths of railway track have been found along the base of the valley side (e.g. at AB14-029, 030B & 036) which may link up with AB14-035 and railway cutting AB14-047.

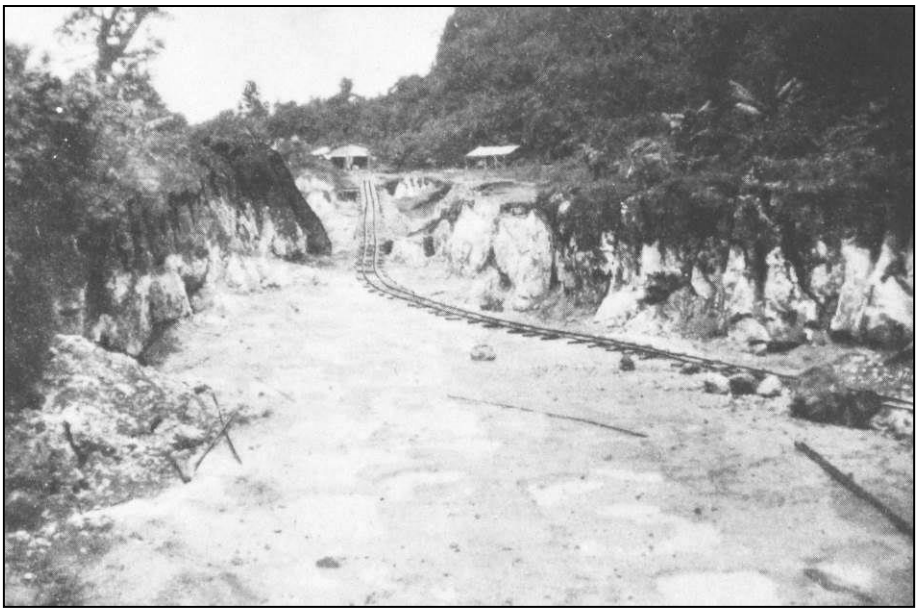


Figure 26 - Phosphate pit & associated narrow gauge railway line near Ngesias in 1936 (Committee14 1950: 119)

AB14-047 Narrow Ledge Railway Cutting and Track

A narrow, level ledge cut into the western side of The Horseshoe/Mortimer Valley that is clearly traceable for 18m. A single rail section of narrow gauge railway track is located half way along the cutting (AB14-047B) which is partially falling into the valley basin. This section may have connected with AB14-039B to form a single narrow gauge railway line that ran along this side of the valley and is perhaps associated with pre-battle phosphate mining activities and particularly mining pit AB14-035.

AB14-003 TBM-1C Avenger 16956 Main Crash Site

A single undercarriage leg from a US Avenger type aircraft and several twisted fragments of aluminum were located on the upper south-west slope of Hill 100/Walt/Pope Ridge. On the crest itself the remains of the propeller and radial cylinder block were visible alongside further fragments of aircraft grade aluminum (Figure 27). The wreckage appears to mark the main impact location of the main fuselage of TBM-1C Avenger 16956 which was reported as shot down over Peleliu on 14th September 1944 during a pre-invasion bombing sortie from USS Enterprise (PacificWrecks 2014). Excavations by the BentProp Project in March 2003 revealed a data plate confirming the aircraft type as well as further sub-surface wreckage and disarticulated human remains (BentProp 2005). Further work was conducted at the site in 2005 by the United States Defense POW/MIA Accounting Agency (PacificWrecks 2014). The port wing (AB209) and forward tip of the vertical stabilizer fin (AB212) of 16956 were recorded over 300m north-north east of the main crash site in 2010 by UoA (Knecht *et al* 2012: 238 & 239). The starboard wingtip was found nearer to AB14-003 (c.114m) in the base of The Horseshoe/Mortimer Valley during this survey (part of AB14-022B) suggesting that the crippled aircraft took a south-south-west trajectory as it descended towards the ground.

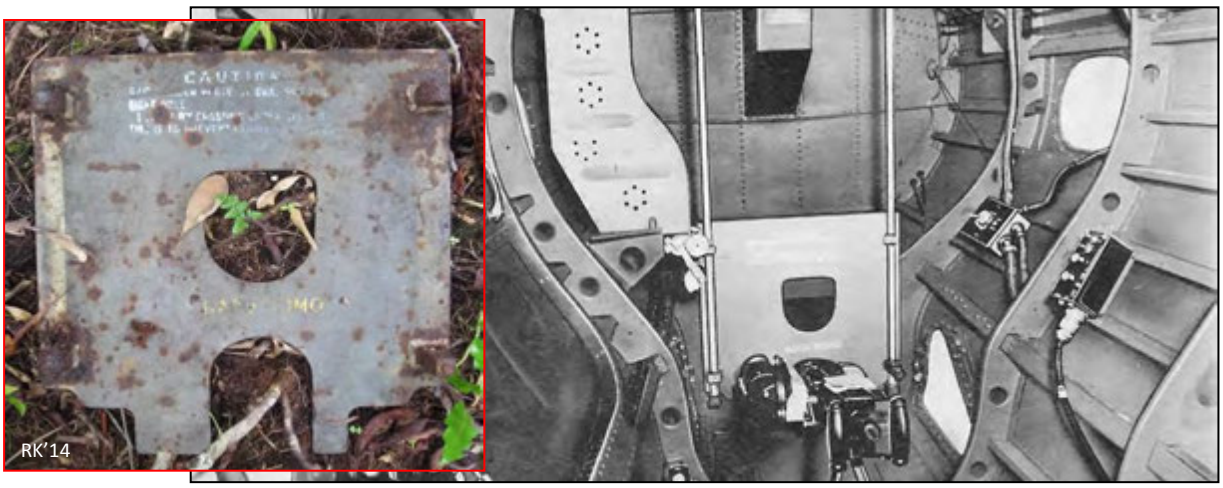


Figure 27 - Sliding armor plate for ventral gun in Bombardiers compartment at AB14-003B

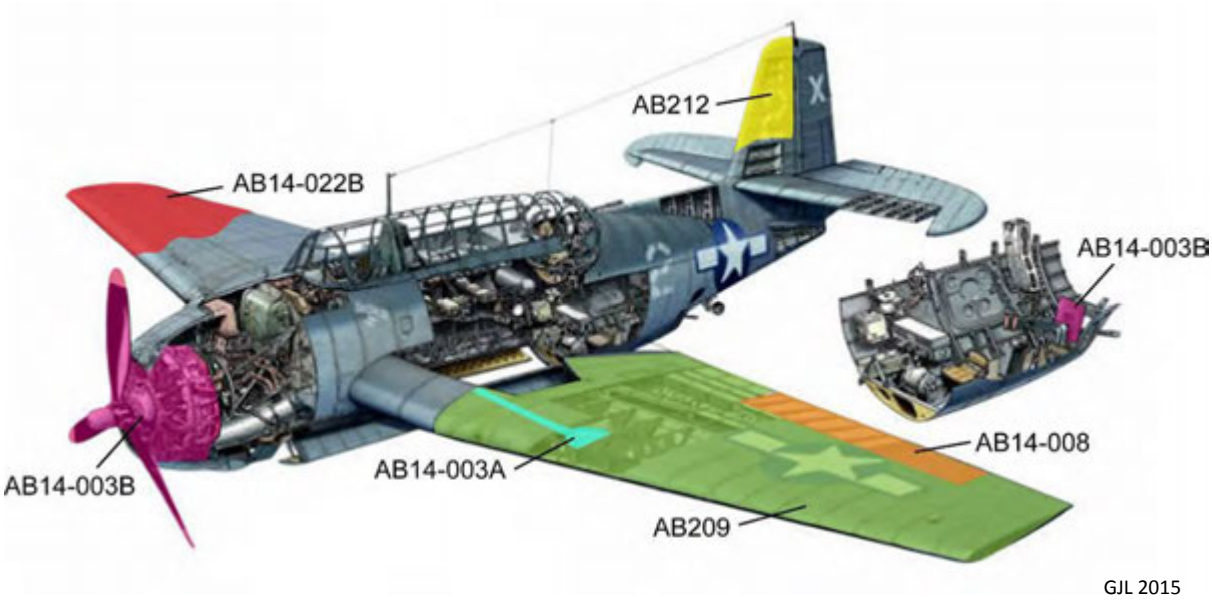


Figure 28 - TBM-1C Avenger 16956: wreckage identified in 2010 & 2014

AB14-008 TBM-1C Avenger 16956 Port Wing Aileron

A TBM Avenger port wing aileron was identified 220m north-east along the ridge from AB14-003 (Figure 29). The stretched fabric skin of the control surface has rotted away exposing the aluminum framing. Small arms caliber holes were observed in some of the framework and some of the cross-spars were fractured. The aileron is most likely that of TBM-1C 16956 which exploded in the air when it was struck by anti-aircraft fire on 14th September 1944.

Figure 29 - TBM-1C Avenger 16956 aileron (AB14-008, left) & wing tip (AB14-022B, right)

3.0.2 Hill 100/Walt/Pope Ridge

PAS'14 Site #	Site Description
AB14-004	IJ Ordnance - 250kg Aerial Bomb HE Filler
AB14-005	Defensive Fighting Position - crescent
AB14-006	US Defensive Fighting Position - rectangular
AB14-007	US Defensive Fighting Position - square
AB14-009	IJ Mortar Platform
AB14-105	IJ Concrete Anti-Tank Casemate

Assistant 1st Marine Division Commander Brigadier General Oliver Smith has indicated that, even in the planning phases of Operation Stalemate II, seizure of the high ground overlooking the landing beaches and the airfield would be critical to the outcome of the battle to secure Peleliu and its strategic assets (Camp 2011: 9). The crests and ridges of the Omleblochel Mountains, described by one US Marine Corps veteran as "*a monster Swiss cheese of hard coral limestone pocked beyond imagining with caves and crevices*" (ibid.: 8) were key and decisive terrain features directly related to their observational qualities. Whilst Colonel Nakagawa's Imperial Japanese defense forces maintained control over this high ground, flat trajectory small arms and ranged weapons such as artillery and mortars could not only be directed onto the advancing US front lines but also onto the US rear echelon supply and bivouac areas, compromising the redevelopment and subsequent use of the airfield. The south facing slopes and southernmost ridges (referred to most frequently as Bloody Nose Ridge), which guarded the approaches to the CCZ, formed the primary decisive terrain and had to be taken prior to any attempts on the cross-compartmentalized box canyon topography of the central ridges. It was against these precipitous peaks and ridges and for the strategically important task of 'blinding' the Japanese defense, so as to secure southern Peleliu, that Colonel Puller threw the weight of the 1st Marine Regt over the first six days of the invasion.

The southernmost crest of the ridge, which forms the eastern side of The Horseshoe/Mortimer Valley, was initially understood to be a single isolated peak of 100ft elevation (accordingly named Hill 100 by the 1st marine Division) which offered a potentially strong position on the extreme right flank of the 1st Marine Division's line of advance, and became a key terrain objective on 19th September (D+4). C *(Charlie)* Company of 1st Bn, 1st Marine Regt under the command of Captain Everett Pope, was tasked with seizing the top

and holding it. An initial advance from the south through the mangrove swamp was halted by crippling crossfire from concealed and emplaced light and heavy machine guns. Following a withdrawal back south through the swamp, a second attempt was made, this time across a narrow causeway with Tank support.

"*Two Japs came up out of spider traps that were in line with our charging Shermans and are attempting to climb up on the back of the tank. The pistol port opens, and a .45 Colt automatic starts popping at the two Nips. The guy in the tank nailed them both. The pistol port closes, the turret swings around to the front, and the big 75mm starts blasting at the machine gun nest."* (Ainsworth 2012: 56)

Under withering fire, both of the leading tanks slipped off the sides of the causeway and became immobilized, closing the route to further mechanized support, and so under a mortar smoke screen Pope's Company crossed the open ground in squad rushes (Figure 30) and scrambled up the near vertical nose of the ridge (Camp 2011: 264-265). *Charlie* Company's hold on the crest was tenuous as they encountered a summit devoid of cover which was swept with gunfire from the opposite side of The Horseshoe/Mortimer Valley and a higher crest 100m to their front, along what now appeared to be a ridge rather than a hill (*ibid*.). The ridge later became known as 'Walt Ridge' whilst the executive officer of the 5th Marine Regt Lieutenant Colonel Walt, who was the highest ranking officer that a cartographic team encountered on the ridge, was remapping this area in October 1944 (Gayle 1996: 26).

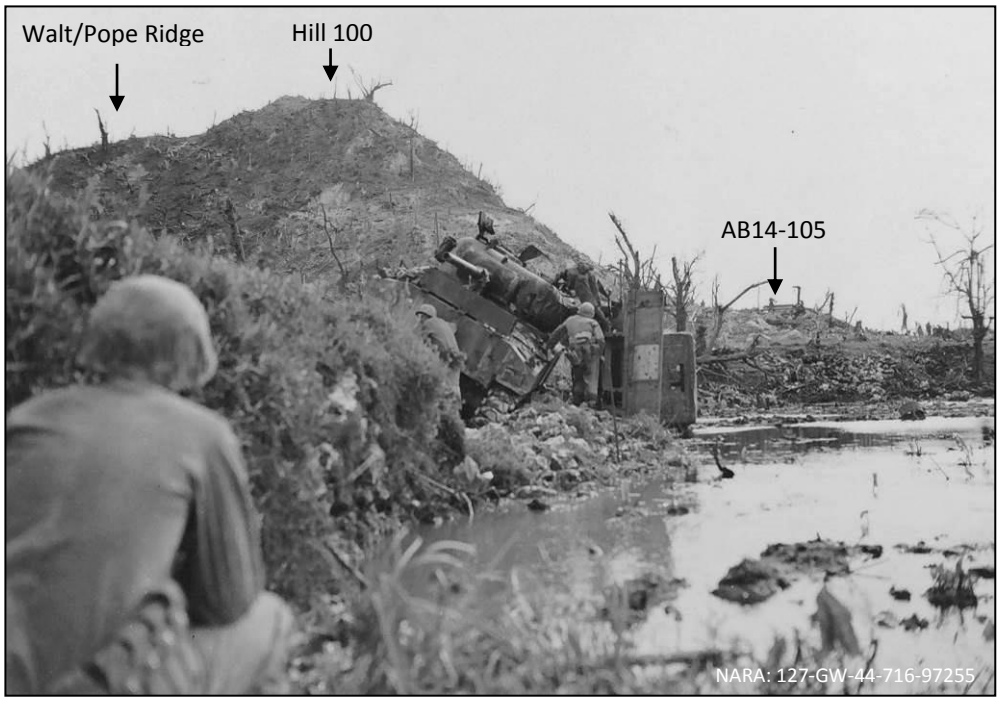


Figure 30 - Moving across the causeway in squad rushes on Hill 100

"At 0515 the inevitable was here, the Nips, now seeing our flimsy line stretching down the side of the hill, are moving towards the very tip of the nose, where Captain Pope and our left flank are putting up a terrific fight to hurl back the vicious counterattack. [...] Out of grenades and with no machine guns left, we are throwing boulders, grenade boxes, C rations, and anything else we can get our hands on." (Ainsworth 2012: 72)

Clinging to the top through a night of brutal hand-to-hand counterattacks, *Charlie* Company (who made the initial attack with 90 men) was eventually forced to withdraw the following morning with their ammunition exhausted and only 15 men and 1 officer remaining. Captain Pope's leadership throughout this action earned him the Medal of Honor, and in recent years, Walt Ridge has become known more frequently as Pope's Ridge.

AB14-105 IJ Concrete Anti-Tank Gun Casemate

In his diary, First Sergeant Ainsworth describes how the crossfire from two concrete pillboxes, situated near the base of Hill 100, were the cause of the failed first advance and that it was fire laid on these positions, by M4 'Sherman' medium tanks of the 1st Marine Tank Bn, that contributed to the eventual success of the squad rushes across the exposed causeway (Ainsworth 2012: 56 & 58). Once across the causeway, Ainsworth and Private First Class Donald Christner investigated one of the casemates, "...*we decide to throw a few grenades into the partly demolished emplacement just as a measure of caution before going further round the ridge. [...] WHAM. WHAM. WHAM. There go our grenades and the pillbox is secured."* (*ibid*.: 59).

Using a recently published version of Ainsworth's diary and contemporary photographs of the area copied from NARA in 2009, it was possible to locate the concrete casemate that Ainsworth and Christner attacked (Figure 30). Much of the causeway area has been heavily landscaped and the majority of the nose of Walt/Pope Ridge carved away by Seabee airfield development work in 1945 which makes battlefield features difficult to trace (Figure 31). The general location and orientation of the casemate as well as its west facing main embrasure (which would have looked out over the causeway) make AB14-105 the most likely candidate for Ainsworth's emplacement. Owing to the extensive disturbance in this area and the loss of most of what was originally defined as Hill 100, this site represents the only surviving battlefield feature from what was a particularly noteworthy engagement on 19-20th

September and one of the last major offensive actions of the 1st Marine Regt prior to their withdrawal from the front line on 21st September.

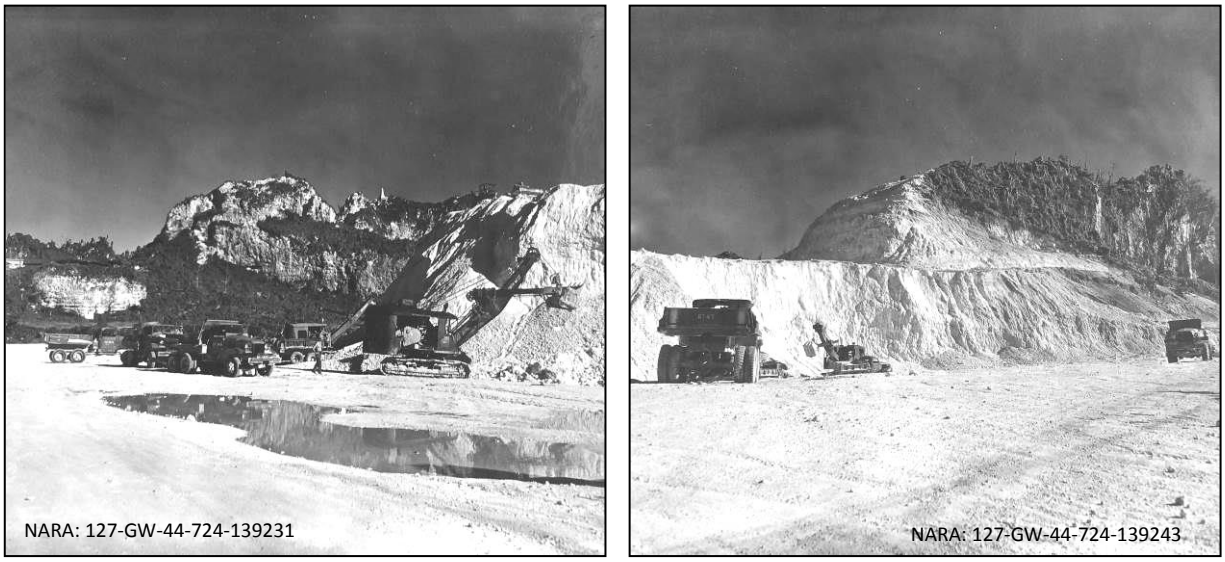


Figure 31 - Seabees obtaining coral rock to improve airstrip highways by excavating the nose of Walt/Pope Ridge, July 1945

The casemate is constructed of shutter cast reinforced concrete and is roughly a trapezium (trapezoid) in plan. It measures 6.48m in length east-west, 3.51m in width across the main embrasure wall, 2.52m in width across the rear eastern wall and 1.95m in height (internal dimensions). The rear wall has a broad opening with large hinges to either side that would have supported a pair of metal doors to allow movement of the artillery piece in and out of the emplacement. A narrow passage leads into a small chamber on the north side of the main emplacement which may have served as a magazine or crew shelter and has received a large caliber impact on the northern corner causing a collapse of the walls and ceiling in this area. The main west facing embrasure is 1.73m wide and has also suffered partial collapse from a large caliber impact directly above it (Figure 32). It is highly possible that these two areas of damage have been caused by 75mm projectiles fired from the US M4 tanks moving across the causeway on 19th September 1944. The impact on the main embrasure would certainly have rendered the artillery piece within the emplacement inoperable. A loophole for local defense and the observation/direction of fire is present in the north wall to the right of the main embrasure.

It is unclear what caliber of artillery piece was emplaced in this position; however, photographic evidence of a mutually supporting timber built emplacement dug into the base of Hill 100 shows it containing a 105mm Type 91 Howitzer. Ainsworth describes AB14-105 as

being an 88mm position, however, only the Japanese Navy possessed a gun of this caliber which it used in an anti-aircraft role and the Type 99 with its static pedestal mount would not have been emplaced in a casemate such as this (Chamberlain and Gander 1975: 35). The size of the emplacement would have accommodated the 75mm Type 38, 90 or 105mm Type 91 with any of their split trails fitting comfortably into the recoil stops cast into the sidewalls of the emplacement.

Figure 32 - AB14-105 main embrasure in 1944 & 2014

AB14-004 IJ Ordnance - 250kg Aerial Bomb HE Filler

A single cylinder of high explosive bomb filler was identified by Cleared Ground Demining personnel in the immediate vicinity of site AB14-003B (Figure 33). Following the complete destruction of IJ aircraft on the ground prior to the invasion of Peleliu, bombs in whole or in part were reused as improvised explosive devices (IEDs). This cylinder, 0.30m diameter by 0.15m high 'cake' of explosive, would originally have been packed into a 250kg bomb casing and was likely removed for use as an IED by Japanese defense forces following the US invasion. No detonator or trigger mechanisms were found so it is unlikely that the filler formed part of an installed IED at the location where it was discovered.

Seizing Hill100/Walt/Pope Ridge

A further attempt was made to take Hill 100/Walt/Pope Ridge by *Charlie* Company, 1st Bn, 7th Marine Regt on 21st September (D+6) which failed to reach the top before being forced back by mounting casualties (Hallas 1994:172). It wasn't until 3rd October (D+18) that G *(George)* and E *(Easy)* Company, 2nd Bn, 7th Marine Regt succeeded where others had failed and managed to take and hold the summit of Hill 100 without suffering casualties. However,

moving northwards along the ridge was another matter and a murderous cross-fire from the 5 Brothers ridge opposite cut down two – out of every four – men crossing the narrow shoulder connecting Hill 100 to the rest of Walt/Pope Ridge (*ibid*.: 213). With ladders, ropes and narrow footholds blasted into the vertical eastern face by Engineers, the ridgetop was eventually taken by dusk (*ibid*.: 214).

Figure 33 - AB14-004: 250kg Aerial Bomb HE Filler

Holding the ridgetop positions was difficult for a multitude of reasons, but one principle factor was the lack of cover. With little to no soil and hard uplifted coralline limestone bedrock to contend with, the Marines and later Army infantry could not construct the defensive earthworks they were trained to dig for consolidating their positions and providing themselves with cover. In the exposed situation that the Marines found themselves in on Walt/Pope Ridge, their training manual would have directed them to construct a hasty fortification beginning with the basic skirmisher trench (Figure 34). Hasty fortifications were to be dug whilst in contact with the enemy or when contact was imminent and were intended to provide a position to fire from whilst, at the same time, offering concealment from observation and protection from flat trajectory hostile fire (War Dept. 1940: 63). Such positions could then be expanded into the ubiquitous foxhole, a much deeper entrenchment requiring 1.2-1.5m of depth, if conditions allowed (Rottman 2005: 32). The nature of the ground forced US soldiers to adapt and instead of digging down they built up. Members of K *(King)* Company, 3rd Bn, 5th Marine Regt developed the technique as early on as their first night on Peleliu and describe, in their published memoirs, a process of piling up loose coral rocks around their positions (Figure 35) (Burgin 2011: 146, McEnery 2012: 212 and Sledge 2010: 68).

Figure 34 - The skirmisher trench: most basic position for riflemen under fire (Rottman 2005: 32)

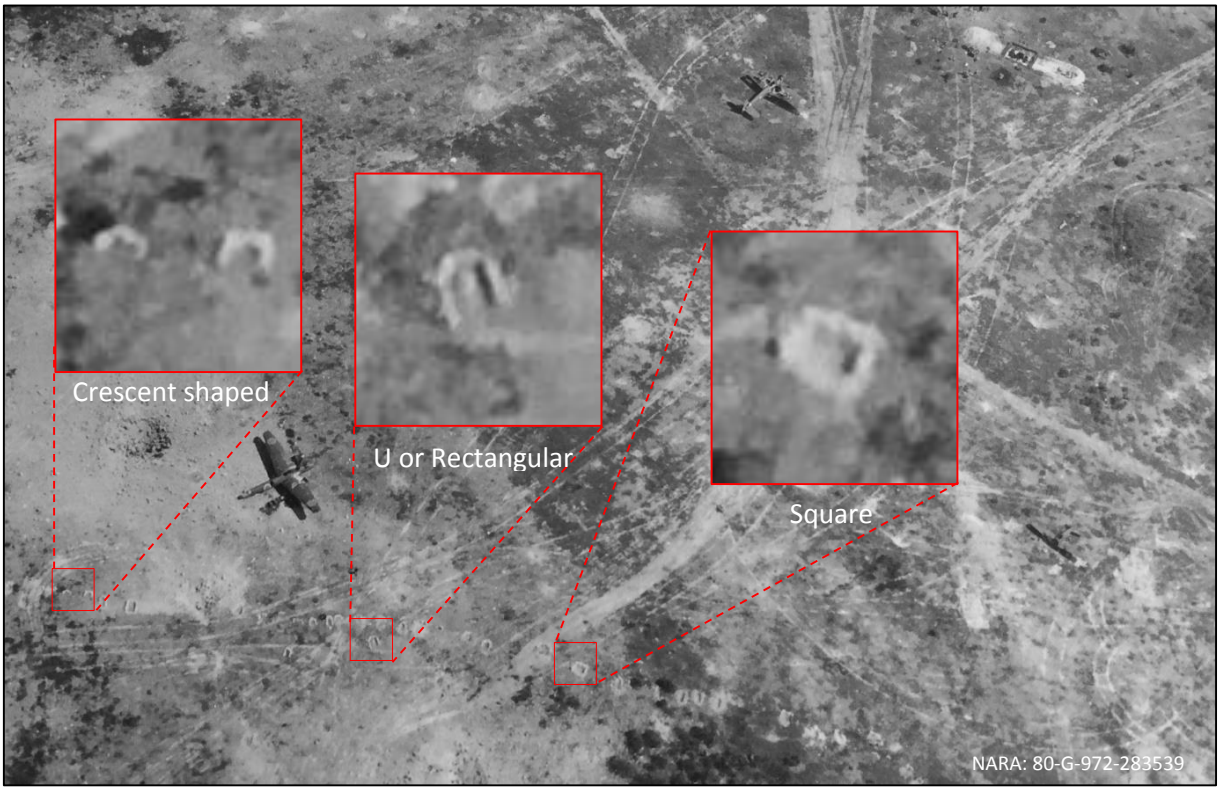


Figure 35 – A line of 5th Marine Regt 'hasty fortifications' on airfield perimeter

AB14-005 Defensive Fighting Position - Crescent

AB14-005 is the first example of an improvised defensive fighting position encountered during PAS'14. It consists of a well-built low crescent shaped parapet, 2.50m long, of evenly sized coralline limestone rocks and is roughly two courses thick and at least three courses high (c.0.70m). It faces east and has a wide view over East Road and beyond. Determining the nationality of improvised fortifications such as this is intrinsically difficult and relies on a close examination of construction quality, the presence of supporting material culture and comparison with definite examples. Given its orientation, solid construction and similarity to Japanese rifle pits documented on Peleliu (Figure 36) this position was most likely erected by IJ troops prior to the US landings. US positions tend to be lower in height and more hastily constructed as they were often put together whilst under heavy fire. The strategic potential of such a solid field fortification would not have been lost on the advancing US troops and it is highly likely that this position was reused as part of the US defenses once the ridge had changed hands.

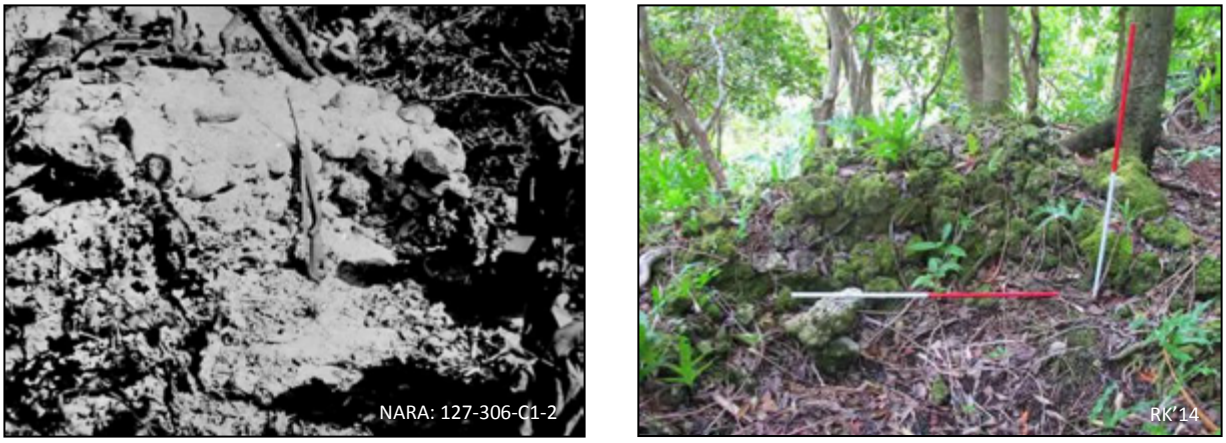


Figure 36 - IJ open rifle pit from Peleliu (left) & AB14-005 (right)

AB14-006 US Defensive Fighting Position - Rectangular

A more complex example of an improvised field fortification on Walt/Pope Ridge situated at a strategically advantageous natural narrowing point on the top of the ridgeline. This narrow rectangular position is heavily overgrown, faces north-west with excellent visibility across The Horseshore/Mortimer Valley basin and has a field of fire which would offer enfilading potential along the south-east edge of the ridge. It follows a similar coral boulder construction to AB14-005 with 0.55m thick walls and a similar height of 0.75m, but is much narrower at only 1m internal width and has upcast protection on all sides. At 2.30m in length, the position would allow a single person to lie fully prone within the interior. A small dog-

legged entrance of 1m turns has been constructed in the west side which opens onto the ridge behind. A cache of expended US .30 cal cartridge cases was found on the top of the north-west parapet (Figure 37). Along a narrow ledge between this position and AB14-007 (50m further north), strands of deployed US type barbed wire are in evidence suggesting an entanglement once ran between these two positions, most likely as security against night infiltration. Similarity in form to US 'hasty fortifications' (Figure 35 & War Dept. 1944a) and the associated material culture indicates that this is a US constructed position.

Figure 37 - AB14-007: general site & detail of .30 cal expended cartridges assemblage

AB14-007 US Defensive Fighting Position - Square

A roughly square defensive fighting position located on a slight elevated knoll with a single entrance break to the north. Similar coral rubble construction to AB14-005 & 006 with walls of comparable thickness and height but generally poorer build quality. Appears to be situated nearer the eastern edge of the ridge so may have been intended to protect against an eastward threat, however, fire and concealment could equally have been effective to the west. The southern wall is partially broken down in the center which may have been caused by an explosive impact or the deliberate creation of a new entrance. What appears to be the top or lid of a metal storage drum was found set into the inner wall of the position. This may have served as an improvised shelf or a level platform to steady a machine gun bipod. The hastier building style, similarity to US styles (Figure 35 & War Dept. 1944a), close association to the barbed wire entanglement and AB14-006 would suggest that this site has been built and used by US personnel.

AB14-009 IJ Mortar Platform

A compacted, level area of coralline rubble forming a 6 x 3.05m platform situated on the south-east reverse slope of a vertical bluff outcrop near the north-eastern end of The Horseshoe/Mortimer Valley. The gently sloping terrain behind the bluff has been levelled with a single course coral rubble retaining wall on the downward sloping south-east side which forms the site. The site is only 11m south-west of a small, mostly collapsed reverse slope entrance (AB14-010A) to an IJ Army artificial Y-Type (a) cave. Caves of this type were known to have entrances opening onto the reverse sides of ridges or hills where mortars would be positioned to fire unobserved over the terrain onto the advancing enemy and were most frequently oriented to the south (Phelan 1945u: 19 & 24). The flat platform nature of the site and its close proximity to AB14-010 makes it very likely that AB14-009 served as an IJ mortar position and is closely associated with the aforementioned cave site.

3.0.3 The Horseshoe/Mortimer Valley

PAS'14 Site #	Site Description
AB14-010	Artificial Cave (Army Y-type (a))
AB14-011A	Artificial Cave (Army I-type)
AB14-012	Artificial Cave (Army I-type)
AB14-013A	Artificial Cave (Navy I-type) - slight coral revetment at entrance
AB14-015	Artificial Cave (Army I-type) - 75mm projectiles imbedded in rear wall
AB14-016	Artificial Cave (Army I-type)
AB14-017A	Artificial Cave (Navy I-type)
AB14-017C	US Defensive Fighting Position - square skirmisher trench
AB14-018	US Barbed High Wire Entanglement
AB14-019	Sealed Cave - rubble collapse
AB14-021	Artificial Cave (Army U-type)
AB14-022	IJ Defensive Strong Point - pair of rock-cut covered 'pillbox-type' rifle pits
AB14-023	IJ Defensive Fighting Position - rock-cut covered 'pillbox-type' rifle pit
AB14-024	Artificial Cave (Army U-type) - dug into large natural vertical fault
AB14-025	Artificial Cave (Army Improved U-type)
AB14-026	Improved Natural Cave (Vertical Fault) - large caliber artillery position
AB14-027	Natural Cave Rock Shelter - improvised fighting position
AB14-028	Artificial Cave (Army I-type)
AB14-029	Improved Natural Cave (Vertical Fault) - expanded to Army L-type
AB14-030A	Natural Cave Rock Shelter - improvised fighting position
AB14-030B	IJ Water Cistern - rectangular near rock shelter
AB14-030C	IJ Water Cistern - square near rock shelter
AB14-031	Artificial Cave (L-type)
AB14-033	Artificial Cave (Army U-type)
AB14-034	Natural Cave Rock Shelter - improvised fighting position
AB14-036A	IJ Defensive Fighting Position - improvised, metal drum revetment rock shelter
AB14-039A	Natural Cave Rock Shelter - improvised fighting position
AB14-040	Natural Cave Rock Shelter - improvised Army I-type fighting position
AB14-041	Natural Cave - improvised fighting position
AB14-043	Natural Cave Rock Shelter
AB14-044	Artificial Cave (Navy U-type)
AB14-045	Natural Cave Rock Shelter - improvised balcony-type fighting position
AB14-046	Natural Cave Rock Shelter - improvised fighting position
AB14-048	IJ Defensive Fighting Position - earth & coral rubble parapet
AB14-050	IJ Defensive Fighting Position - forward observation post

Artifact Site / Small Find #	Artifact Description
AB14-011B	IJ Food Carrier - located between AB14-011 & 012
AB14-013B	USMC Jerry Can - near cave entrance
AB14-017B	F4U Corsair Drop Tank - mounting bracket
AB14-032A	Caisson Assemblage - 37mm type 94 caisson
AB14-032B	Caisson Assemblage - 37mm type 94 caisson with spares/tool kits
AB14-032C	Caisson Assemblage - 37mm timber spoke type caisson
AB14-032D	Caisson Assemblage - 37mm type 94 caisson
AB14-036B	US Mortar Bomb Fragment Spread - near rock shelter
AB14-036C	Fragment of Armor Plate - near rock shelter
AB14-037A	Material Assemblage - IJ water pumping engine
AB14-037B	Material Assemblage - IJ metal caisson/limber wheel rims
AB14-037C	Material Assemblage - US 60 & 81mm mortar bomb fragments, x2 IJ 75mm projectiles
AB14-037D	Material Assemblage - US 60 & 81mm mortar bomb fragments, x1 IJ 70mm projectile
AB14-037E	Material Assemblage - IJ collapsible hand cart
AB14-038B	Material Assemblage - IJ caisson/limber wheel rims & 70mm ammunition containers
AB14-038C	Material Assemblage - US M140A1 packing containers & railway sleeper clamps
AB14-042	IJ Field Artillery Battery Wagon Caisson & Limber
AB14-SF001	Disarticulated Human Remains - femur, tibia, rib & long bones
AB14-SF002	US 60mm M83A1 Illuminating Mortar Bomb Casing
AB14-SF003	US 105mm Projectile
AB14-SF004	Pick Axe Head & 81mm Mortar Bomb Casing Fragment
AB14-SF005	Tubular Pole, .50 cal Cartridge & x2 60mm M83A1 Illuminating Mortar Bomb Casings
AB14-SF006	US 60mm M83A1 Illuminating Mortar Bomb Fragments
AB14-SF007	IJ Mess Kit
AB14-SF008	IJ Mess Kit - flattened
AB14-SF009	US 60mm M83A1 Illuminating Mortar Bomb Fragments
AB14-SF010	US .30 cal Ammo Box Lid & Corroded Large Caliber Projectile Fuse
AB14-SF011	US Large Caliber Projectile Shrapnel Fragment
AB14-SF012	US M1918A1/2 BAR Magazine - empty
AB14-SF013	US Caterpillar Tread Fragment
AB14-SF014	IJ Type 92 'Lewis-type' HMG Tripod
AB14-SF015	Improvised US Army Lighting Pylon
AB14-SF016	US Jerry Can
AB14-SF017	IJ Sewing Machine Flywheel
AB14-SF018	Possible IJ 50mm Type 10 Grenade Discharger Barrel
AB14-SF019	IJ Water Storage Cylinder
AB14-SF020	IJ Water Storage Cylinder - bullet riddled
AB14-SF021	US 60mm M83A1 Illuminating Mortar Bomb Casing
AB14-SF022	Metal Storage Drum
AB14-SF023	IJ LMG Bipod
AB14-SF024	x2 US 60mm M83A1 Illuminating Mortar Bomb Casings
AB14-SF025	US 60mm M83A1 Illuminating Mortar Bomb Casing
AB14-SF026	Rubber Tire & Metal Wheel Rim
AB14-SF027	Barbeque Cooker Stand
AB14-SF028	Barbeque Cooker
AB14-SF029	x7 IJ HMG Tripod Carrying Frame Components
AB14-SF030	IJ Water Filtration System Cylinder & Filters
AB14-SF031	Glass Bottle & Wheel
AB14-SF032	Metal Storage Drum - bullet riddled
AB14-SF033	IJ Cast Iron Water Pipe & Survey Marker
AB14-SF034	Glass Bottle & Twisted Metal Fragment
AB14-SF035	x3 US 60mm M83A1 Illuminating Mortar Bomb Casings & Glass Bottle
AB14-SF036	x3 Glass Bottles
AB14-SF037	Flat Metal Band

AB14-SF038	IJ Wheel hub & Axle Assembly
AB14-SF039	Metal Lamp & US 60mm M83A1 Illuminating Mortar Bomb Fragment
AB14-SF040	Wheel Hub, Tie Rod & Cooling Core
AB14-SF041	US 60mm Mortar Bomb Fragment
AB14-SF042	Metal Storage Drum & Large Shrapnel Fragments
AB14-SF043	Japanese Glass Bottle
AB14-SF044	IJ Survey Marker
AB14-SF045	US Naval Ordnance - 5inch Mk35 Projectile & Illuminating Mortar Bomb Fragment
AB14-SF046	US Ordnance - 60mm Mortar Bomb
AB14-SF047	US Naval Ordnance - 5inch Mk35 Projectile & IJ Metal Cart
AB14-SF048	Metal Tent Stake
AB14-SF049	US Ordnance - 30lb HE Demolition Charge
AB14-SF050	Pick Axe Head & US 81mm M56, M57 or M301 Mortar Bomb Fragment
AB14-SF051	IJ Kendo Masks, Tent Stake & 81mm Mortar Bomb Cloverleaf Bundle Midcap
AB14-SF052	IJ Bicycle Frame
AB14-SF053	US 81mm M56, M57 or M301 Mortar Bomb Base & Fin Assembly
AB14-SF054	Wheel Axles
AB14-SF055	IJ Survey Marker
AB14-SF056	IJ 50mm Type 10 Grenade Discharger - complete
AB14-SF057	IJ 6.5mm Type 38 'Arisaka' Rifle Barrel
AB14-SF058	US M140A1 81mm Mortar Ammunition Container, Shovel & IJ Mess Tin
AB14-SF059	IJ 6.5mm Type 38 'Arisaka' Rifle Trigger Guard
AB14-SF060	IJ Broken Metal Rimmed Spectacles, Buckle, Button & IJA Respirator Eye Lens
AB14-SF061	IJ Railway Track Anchor Iron
AB14-SF062	IJ Battery Powered Torch (flashlight)
AB14-SF063	IJ 37mm Cartridge & Large Metal Cooking Bowl
AB14-SF064	IJ Collapsible Hand Cart & Wheel

Although a diversionary armor incursion was made into The Horseshoe/Mortimer Valley from the south on 3rd October (D+18), the first fully organized advance was made by elements of the 3rd Bn, 5th Marine Regt heavily supported by tanks of 3rd Platoon, A *(Able)* Company, 710th Tank Bn on 7th October (Figure 38). Over the course of the day, the M4A1 tanks moved northward and endeavored to return the intense small arms and artillery fire being discharged from a multitude of concealed positions along the sides of the valley (Committee14 1950: 82-84). The infantry quickly became pinned down by the volume of small arms fire and tanks firing on any potential Japanese position were disabled by mines and forced around natural obstacles such as Grinlinton Pond bunching up under direct fire from anti-tank guns (*ibid*.). Withdrawing under a smoke screen, the valley was deemed too heavily defended for future assaults from the south (*ibid*.)

It was not until the construction of Road X by armored bulldozers working in from East Road through a draw at the north end that it became possible to seize and hold The Horseshoe/Mortimer Valley. The creation of Road X was considered the key to the successful opening up of the Japanese defensive positions in the eastern CCZ (Committee14 1950: 91)

and it enabled many of the prepared south facing defenses to be attacked from the rear. Army infantry and tank teams, supported by LVT flamethrowers and M10 tank destroyers, consistently moved into the valley between 19th and 21st October using Road X as the main access point. Moving southwards from cave to cave with demolitions charges and portable flamethrowers, I *(Item)* Company, 3rd Bn, 321st RCT finally succeeding in suppressing opposition and began the occupation of the hotly contested valley (*ibid*.: 94-97).

Figure 38 - An M4A1 Sherman hits a mine whilst advancing into The Horseshoe/Mortimer Valley

AB14-010 Artificial Cave - Army Y-Type (a)

An excellent example of an artificial cave interpreted as a Y-Type (a) using Phelan's classification system. Three entrances were identified, two facing north-west towards the valley basin (A&C) and a third very small and partially sealed entrance (B) opening onto the reverse slope near mortar platform AB14-009 (Figure 39). Access to the cave was only possible via the middle sized escape entrance (C) as the main combat entrance (A) is partially blocked. A flat area 14.10m long by 6.50m wide extends from combat entrance A and is enclosed by a low coral rubble wall. A total of 616 unfired rounds of 7.7mm caliber ammunition were recovered from the cave interior by Cleared Ground Demining as well as 12 unfired 50mm Type 89 mortar bombs, indicating that the cave and particularly the flat enclosure to the front may have served as a significant heavy machine gun (HMG) and mortar firing position. The presence of several 7.7mm strip clips suggest it was a Type 92 'Hotchkiss-type' HMG that was operated from here.

Figure 39 - AB14-010 entrances: A (left), C (middle) & reverse-slope entrance B (right)

From the low mouthed escape entrance, the cave slopes down into a single main passageway (2.08x1.82m [WxH]), which runs parallel to the valley side for 9.13m (Figure 40). The north end is blocked by rockfall debris preventing access to the passageways leading to entrance A and B. A single large niche (2.20x3.26m [WxD]) exists in the rear wall where the majority of artifacts have been pushed against the rear and side walls (Figure 41). This is also the case within the main passageway where artifacts form clustered concentrations around the walls and at corners (Figure 41). Disarticulated human remains were identified in two discrete locations with a small number of medical bottles, ampoules and phials found in close proximity to each. The central niche predominantly contained domestic material such as broken glass bottles, cookware and personal mess kit items suggesting that it was used for non-combat activities. A large number of metal rice bowls, spoons, mess kits and water bottles were also found in the main passageway (Figure 42). Army 'model 95' service respirator (gas mask) canisters, molded tissot tube fragments and accessories such as anti-fog discs and antifreeze liquid syringes were recorded throughout the main passageway assemblages confirming the presence of army personnel in the cave. No items of distinctly IJ Navy origin were observed. Survey and recovery work conducted by Cleared Ground Demining in 2013 recovered a total of 660 explosive remnants of war from the cave, the majority of which were concentrated in the main passageway near the central niche.

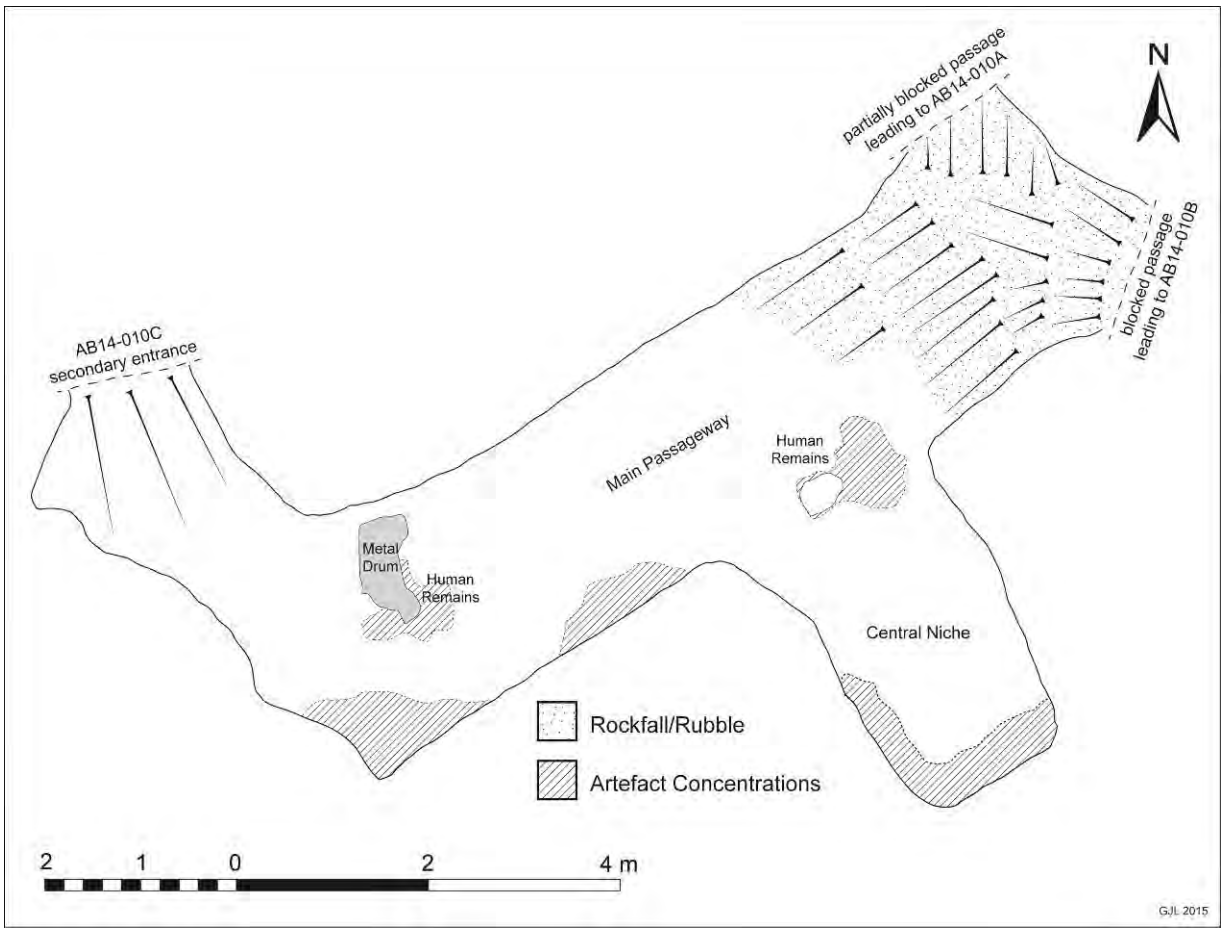


Figure 40 - AB14-010: cave interior floor plan

Figure 41 - AB14-010: main passageway looking NE (left) and central niche (right)

Whilst looking for a place to position a pair of 37mm anti-tank guns at the top of The Horseshoe/Mortimer Valley, Nolton Brown of the 321st RCT anti-tank company was instrumental in organizing the attack that reduced this cave on the 17th October:

"*There was a grade up to this little plateau where I wanted to place the guns. There was this cave to be dealt with – we did not want to blow it for it would blow most of the level ground where we wanted to place the guns. There were three tanks sitting just off the road [...] so I went over and asked them if they would go up and put a few 75mm rounds into the entrance of the cave. [...] He drove to the entrance of the cave and fired five or six rounds of 75s into the entrance, and backed out. Then one of the biggest Japs I ever saw, at least six feet, stepped out and threw a box charge at the tank. It failed to go off, and the Jap ducked back into the cave."* (Blair and DeCioccio 2014: 177). This description likely relates to the heavily collapsed reverse slope cave entrance B. The account continues: "*I left my squad to cover the entrance with their rifles. I took off to find a flamethrower. [...] When we returned the guys from E Company hollered and pointed at the valley floor. [...] It looked to be another entrance to the cave above. I moved some guys around so they could cover it. The sailor boy moved his rig to the entrance and started pouring fire in them. They [Japanese] started to run and holler. My guys and some E Company guys killed nineteen coming out."* (*ibid*.: 177-178).

Figure 42- AB14-010: antifreeze liquid syringe and rice bowl containing medical ampoules & phials (left) abandoned but neatly stacked rice bowls and cutlery (right)

Artifacts Noted:
disarticulated human remains • IJA gas mask parts • IJ canteens & mess kits • empty 7.7mm HMG strip clip • IJ medical kit • metal rice bowls & cutlery • glassware • batteries • IJ porcelain sherds • ammunition canister lid • crumpled metal storage drum

AB14-011 Artificial Cave - Army I-Type

The most northerly of three mutually supporting and closely located I-type combat caves on east side of The Horseshoe/Mortimer Valley. Small west facing cave mouth 1.07m wide x 1.50m high opening into shallow flat floored chamber 1.90m deep. Appears to be unfinished with pick marks visible on the rear wall from construction.

Artifacts Noted:
small fragment of human bone and a tooth • Palauan pottery sherds • worked wood fragments • IJ 7.7mm unfired small arms ammunition (SMA) • unexploded US 75mm projectile imbedded in rear wall • IJ food carrier noted between AB14-011 and 012

AB14-012 Artificial Cave - Army I-Type

Central of three mutually supporting and closely located I-type combat caves on east side of The Horseshoe/Mortimer Valley. Small west facing rounded cave mouth 1.80m wide x 1.50m high opening into shallow flat floored chamber 3m deep. Two holes in the rear wall of the cave most likely caused by the impact of large caliber projectiles, possibly a US 75mm.

Artifacts Noted:
small assemblage of disarticulated human remains including ulna • fragments of IJ standard issue leather belt & pouch • IJ canteen

AB14-013 Artificial Cave - Navy I-Type

The most southerly of three mutually supporting and closely located I-type combat caves on east side of The Horseshoe/Mortimer Valley. Rectangular, west facing cave mouth 3.08m wide x 1.55m high opening into a single chamber 6.09m deep with a shallow niche (0.48m deep) in the northern side wall. Steep downward inner slope from entrance with partial coral rubble revetment to either side. Two bullet riddled metal storage drums that once formed part of an improvised revetment wall are collapsed down the slope into the cave. Approximately six large caliber projectile impact marks are visible above the entrance which may have been caused by US 75mm tank rounds. AB14-SF014 Type 92 ‘Lewis-type’ HMG tripod mounting was located c.20m downslope from the cave entrance and may have originated from this position. The smooth, walls and use of drum barricades suggest a navy-constructed cave.

Artifacts Noted:
small assemblage of disarticulated human remains including possible cranium fragments & flanges • metal ration can fragments • USMC stamped jerry can found near entrance

AB14-015 Artificial Cave - Army I-Type

A west facing, single chamber artificial cave on the east side of The Horseshoe/Mortimer Valley. Appearing almost oval in section this cave is 2.55m wide, 1.73m high and 7.60m in depth. A considerable rockfall at the rear masks the majority of the floor area. Several large caliber projectile impact marks are visible in the rear wall which are likely a result of US 75mm tank fire. These impacts have subsequently formed the rubble debris in the cave which potentially seals artifacts beneath it as none were evident on the surface.

AB14-016 Artificial Cave - Army I-Type

A single chambered artificial army combat cave facing west with relatively smooth walls and ceiling. Located on the eastern side of The Horseshoe/Mortimer Valley, this cave lacks any additional prepared defenses at the 3m wide entrance but large vine branches above the entrance indicate there may have been a reliance on vegetation to provide concealment. The main chamber is 10.71m in length, 2.32m wide and 2.02m high with a flat base.

Artifacts Noted:
small assemblage of disarticulated human remains in cave center • fragments of IJ standard issue leather belt, SMA pouch and rubber boot soles near entrance • assemblage of unfired 7.7mm SMA on a small shelf and floor near the rear of the cave with what looks like rusted fragments of a Type 99 curved box magazine

AB14-017A Artificial Cave - Navy I-Type

Rectangular section, smooth walled, single chamber Navy type shelter cave facing west on the east side of The Horseshoe/Mortimer Valley. Measures 2.26m wide, 11.10m deep and 1.49m high. A hastily prepared coral revetment wall/firing parapet has been constructed on the south side of the entrance and augmented with concrete-filled metal storage drums, most of which have since collapsed down the steep inner slope into the cave. Rubble and a basic soil formed across parts of the floor may seal further artifacts to those found.

Artifacts Noted:
small disarticulated human remains towards rear of cave • a 5 round rifle clip of unfired 6.5mm SMA and an IJ leather ammunition pouch against the rear wall • metal rice bowl • broken blue-green glass fragments

The mounting bracket for an F4U Corsair drop tank was identified within close proximity of the cave entrance and recorded separately as AB14-017B. It is the same type as an example found in Wildcat Bowl in 2010 (AB115). This particular type of 265 gallon external fuel tank

was carried centrally under the fuselage of F4U and FG-2 Corsairs of VMF-114 and VMF-122 operating from Peleliu during the battle and were used to carry and drop napalm on the Japanese positions in the Omleblochel (Figure 43) (Daniel 2014: 87); 193 drop tanks were used in just 8 days on Peleliu for this purpose.

Figure 43 - AB14-017B (left) and VMF-114's belly tank dump on Peleliu, Oct'44 (right)

AB14-017C US Defensive Fighting Position - Square Skirmisher Trench

Initially this 1m square, shallow pit was interpreted as being associated with cave site AB14-017A and recorded as a suffix of this site. Located on a prominent knoll, the small pit overlooks a strategic narrow point in The Horseshoe/Mortimer Valley basin across which a barbed wire entanglement (AB14-018) was subsequently found to have been constructed. The pit offers excellent enfilading fire along the length of the barbed wire entanglement and is therefore considered to be associated with it. As the entanglement has been interpreted as a US field fortification, the pit is likely a small US skirmisher trench or very shallow foxhole, possibly augmented with sandbags to form a higher parapet, from which a rifleman or light machine gunner could provide close supporting fire to defend the obstacle, particularly at night (War Dept. 1944b: 192).

AB14-018 US Barbed 'High Wire' Entanglement

A triple row of metal angle iron pickets stretching between the base of a prominent knoll near the eastern edge of The Horseshoe/Mortimer Valley basin and the coralline limestone sink holes at the edge of Grinlinton Pond. The angle iron pickets are of a standard US Army type (War Dept. 1940: 121) and have one-wire type barbed wire with two-point barbs

wrapped around and between some of them. The arrangement and spacing of the angle iron pickets indicates that they likely formed a three row High Wire type entanglement where a line of barbed wire was strung horizontally, low to the ground and a second line strung at the top of the pickets with diagonals running in a zig-zag between the rows from top to bottom (*ibid.*: 125-129) (Figure 44). The entanglement likely formed part of the defensive perimeter established by *Item* Company, 3rd Bn, 321st RCT on the evening of 22nd October (D+37) that ran from the base of Brother 2, around the north end of Grinlinton Pond and down the east side of the valley (Blair and DeCioccio 2014: 193).

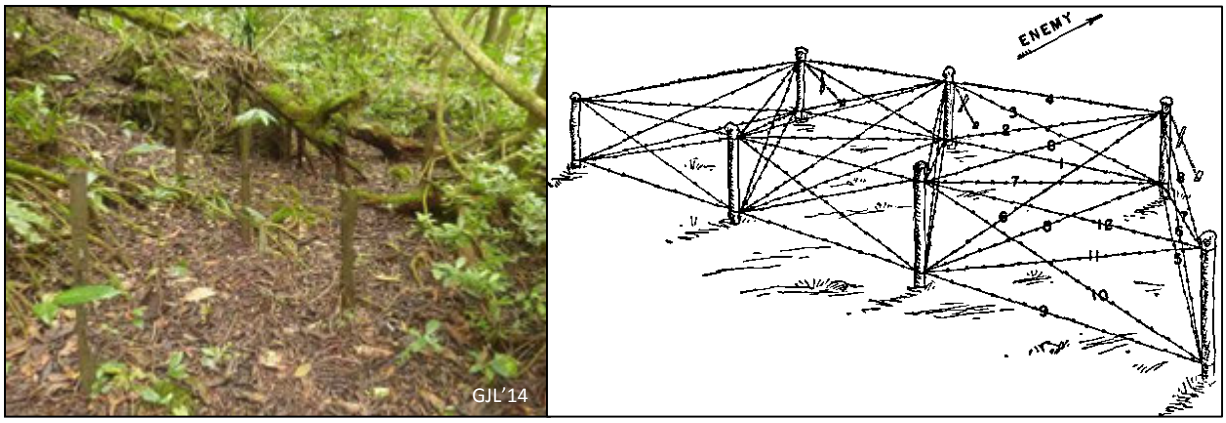


Figure 44 - AB14-018 angle iron pickets (left) and High Wire entanglement (War Dept. 1940: 129) (right)

AB14-019 Sealed Cave

A narrow v-shaped recess facing north-west in a near vertical rock face on the eastern side of The Horseshoe/Mortimer Valley (1.49x1.40x1.16m [HxWxD]). Large build-up of fairly loose coralline limestone rubble and larger boulders at base of recess and spreading down slope from the site. A pre-battle Japanese survey marker is located c.1m from the recess. No artifacts were visible at this site. The loose rubble and general form of the site suggests that this may be the top of a sealed cave entrance. A narrow ledge (3x1m [LxH]) high exists above the recess which may have served as a concealed sniping position associated with the cave.

AB14-021 Artificial Cave - Army U-Type

A substantial man-made cave constructed in an even u-pattern with undulating near vertical walls and squared corners where they meet a relatively flat, high ceiling. Both the personnel and the combat entrances have been partially infilled with fine, loose coral rubble creating steep downward inner slopes to negotiate before entering the more spacious main passageway. At the most southerly combat entrance, the remains of an IJ 37mm Type 94

'infantry rapid fire' gun are visible with the barrel orientated south-west towards the mouth of The Horseshoe/Mortimer Valley (Figure 45). It is partially buried up to the axles of the carriage with the barrel and breech assembly visible on the surface along with the upper portions of the metal rims for the wooden spoke wheels which have rotten in situ. The Type 94 was used in the infantry close support role firing high explosive and anti-tank projectiles (War Dept. 1944c: 218) and was light enough to be manhandled across rough terrain (Chamberlain and Gander 1974: 30). Japanese anti-tank guns such as this one failed to penetrate the thick front armor of M4A1 Sherman tanks but were successful at disabling them by firing on more vulnerable parts (Committee14 1950: 84). On 8th October, a six tank attack was made by 1st and 3rd Platoons, *Able* Company, 310th Tank Bn into the valley to neutralize anti-tank guns:

"*When the second tank reached a position some 100 yards north of the mouth of the valley it was fired on and hit by a Japanese antitank gun, from the base of Walt Ridge. The Japanese gun was so cleverly concealed that it was impossible to locate its position. [...] the tanks moved up into the valley, but were again stopped by the Japanese gun on Walt Ridge. However, this time the Japanese gun was located and destroyed by tank fire."* (Committee14 1950: 83-84).

With its square section design, average height of 1.80m and width of 2.46m, the cave interior could easily have accommodated the Type 94 being drawn back into the cave when not in use to conceal it from view. The accumulations of powdery rubble at the entrance and around the field gun are likely a result of tank fire pulverizing the rock above the entrance of the cave in an effort to neutralize the position and silence the gun on the 8th October 1944.

The density of artifacts, quality of preservation and lack of disturbance in this cave are quite remarkable (Figure 46). In one instance, a small assemblage of human remains is present in close association with the upper fragments of a brown leather boot, personal hygiene items (soap dish, tooth brush, etc.), chop stick holder and an oil/methylated spirits lamp burner. The material evidence would suggest the remains may be those of an IJA officer.

Artifacts Noted:
small disarticulated human remains towards personnel entrance with associated high rank IJA items • a 5 round rifle clips of unfired 6.5mm SMA and IJ leather ammunition pouches • IJA gas mask lenses • personal hygiene kit • 37mm ammunition carrying frame

(similar to limber trays) • undetonated IJ type 91 & 95 hand grenades • IJ canteens & mess kit • complete glass bottles and fragments • writing ink capsules • small glass phials • rubber boot sole fragments • 37mm projectile • IJA belt buckle • fountain-type pen lid

Figure 45 - AB14-021: combat entrance with 37mm Type 94 (exterior) and ammo carrier (interior)

Figure 46 - AB14-021: main passage showing material spread across floor - pen lid & boot-uppers inset

AB14-022 IJ Defensive Strong Point

A pair of substantial, mutually supporting defensive fighting positions of similar layout were encountered on the lower, eastern side of The Horseshoe/Mortimer Valley base approximately 7m apart. Both positions consist of shallow, flat bottomed rectangular pits (B: 4.08x2.37x0.56m & C: 4x2.30x0.73m) with coral rubble parapets on their northern sides and

access from the west through short trenches (B: 3.89x1.12m & C: 2.08x1.17m). They follow the same pattern as a third example recorded as AB14-023 c.14m to the north-east. The interior of Position B is dominated by a large section of aircraft wreckage which has been interpreted as the starboard wing tip of TBM-1C Avenger 16956 which exploded in mid-air after being hit by anti-aircraft fire on 14th September 1944 (Figure 29). The fragment is in keeping with the wide spread nature of wreckage from this aircraft and is situated c.114m north-north-east of the main crash site AB14-003. A well preserved IJA helmet was found in close proximity to Position B (Figure 47). Position C appears to have been partially infilled and no artifacts were evident on the surface.

Figure 47 - AB14-022B: IJ Defensive Fighting Position & IJA helmet

Given the shallow nature of these defensive fighting positions, it is unlikely that they served as open fire trenches or rifle pits. The level of rubble infill and the presence of access trenches suggest that both fighting positions may have been covered, possibly with a lattice of coconut logs supporting a coral rubble roof. Examples of this pillbox-type of field fortification, which could have housed riflemen or machine gun teams, have been noted elsewhere on Peleliu (Figure 48 & NARA: 127-306-C1-2) and in the wider Pacific Theatre of Operations (Rottman 2003: 8, 20 & 25-26). Imperial Japanese military doctrine favored an active, aggressive form of defense which saw mutually supporting defenses such as AB14-022B,C & AB14-023 clustered into strongpoints to protect key terrain features (*ibid.*: 17 & 19). These three positions utilize subtle changes in elevation to provide a strong field of fire across the narrowest traversable part of the valley floor forming a stopper in a natural bottle-neck with Grinlinton Pond to the west and the steep slopes of Walt/Pope Ridge to the east.

Figure 48 - Covered 'pillbox-type' rifle pit east of Unnamed Islet, Peleliu

AB14-023 IJ Defensive Fighting Position

The third of three mutually supporting defensive fighting positions forming a strongpoint on the lower eastern side of The Horseshoe/Mortimer Valley base. Located 1m higher and c.14m north-east of the other two Positions (AB14-022B & C), this site follows a similar pattern with a narrow trench (1.88x1.17m) providing access from the west into a shallow, partially infilled rectangular pit (9.19x2.50x0.27m) with a low coral rubble parapet extending along its north-western side. The inner face of the north-western side of the main pit has been partially reinforced with sheet metal revetment (Figure 49). A large, narrow necked glass bottle and an IJ water canteen are visible in the upper fill of the main pit. Similarly to AB14-22B & C, this site was likely a covered 'pillbox-type' rifle or machine gun pit. Large coral boulders positioned along the slopes of the lower valley basin between AB14-22 and 23 may have provided additional concealment as improvised fighting positions for individual riflemen as part of the broader strongpoint.

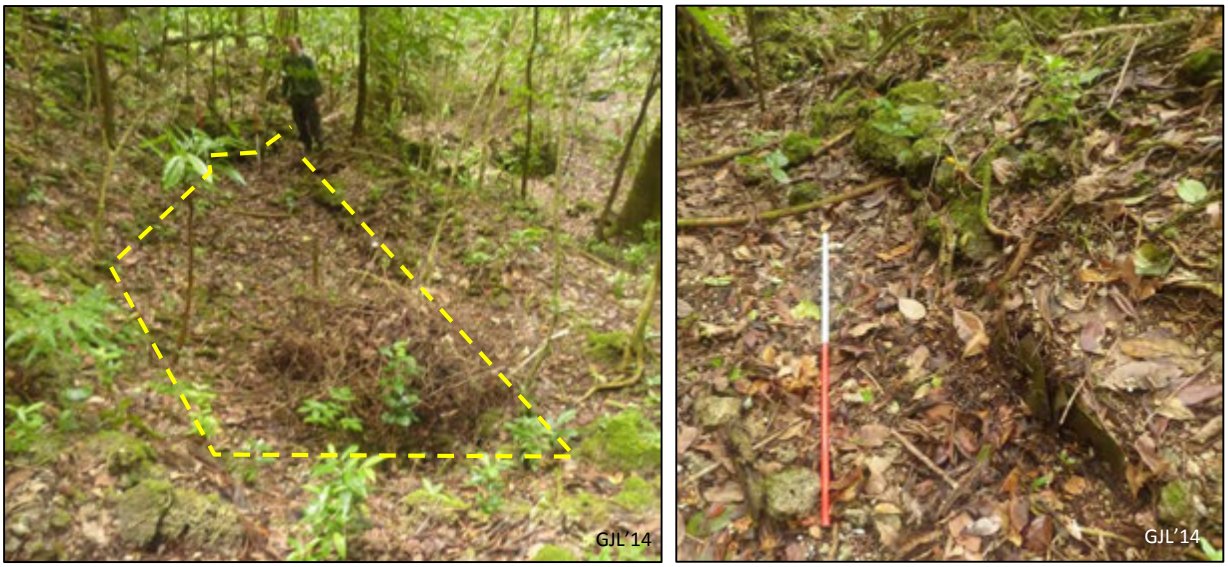


Figure 49 - AB14-023: IJ covered 'pillbox-type' rifle pit with sheet metal revetment

AB14-SF015 Improvised US Army Lighting Pylon

As the Imperial Japanese forces became isolated within 'Hell's Pocket', fresh water sources became scarce. One of the few naturally occurring sources, other than collected rain water, was Grinlinton Pond in the northern base of The Horseshoe/Mortimer Valley. The US Army's operations in this area were interpreted as a strategic move to break this critical supply line: "*Their plan seems to be to cut us off from our fountain head in the south western lowland of Chuzan. The enemy attack in this area was persistent, but we hold the fountain head because this is where we obtained our water supply at night*." (USAHEC 1946b: 161). With the establishment of *Item* Company, 3rd Bn, 321st RCT's defensive perimeter at the north of the valley, access became increasingly difficult: *"A part of the enemy invaded Nanseizan and constructed zig-zag wire entanglements to hinder the water supply to our forces from the fountain head."* (*ibid*.: 162).

In addition to the wire entanglements, *Item* Company also erected spot lights fabricated from vehicle equipment (USAHEC 1946c: Vol.2, Ch.2: 36) (Figure 50). This improvised illumination system proved highly effective in combating the IJA's night infiltration tactics as well as putting a stop to water collection under cover of darkness. At 20:40 on the evening of the 25th October, members of *Item* Company heard running feet and rattling canteens; when the floodlights were switched on, seven Japanese soldiers were seen drawing water from Grinlinton Pond (The 81st WDHC 1948: 179). Private John Engstrom recalled: "*They'd drag fifty or one hundred canteens on the ground and try to fill them with water and take them back into the caves. They were just ducks on the pond out there.*" (Blair and DeCioccio 2014: 203).

The remains of one of the improvised lighting pylons were found at the northern tip of Grinlinton Pond (Figure 51). A long pole was identified lying on the jungle floor and appears to be made from an L-shaped length of angle iron that has been straightened. There are three sections to the pole: the first is nearly 3.93m long extending north-north-west to where the angle iron has been straightened to make an extension 2.06m long. The third section extends out from the bend point for 2.01m before terminating approximately 0.5m away from what appears to be a foundation anchor or baseplate that would accept angle iron. The various components show evidence of being cut with a blowtorch and welded together. A single vehicle head lamp, possibly from a ¼ ton Jeep is located c.2m from the baseplate near

the longest section of angle iron and almost certainly was attached to the pole to provide illumination.

Figure 50 - Improvised floodlight at the north end of Grinlinton Pond, 12 Oct'44

Figure 51 - AB14-SF015: spotlight pole (left), headlamp (top right) and anchor plate (bottom right)

AB14-024 Artificial Cave - Army U-Type

This artificial cave is situated within a large triangular cleft (6.01x6.90m) in the vertical cliff face at the head of The Horseshoe/Mortimer Valley (Figure 52). Fine coral rubble material and larger rocks spread down the slope from the cleft forming a large alluvial fan. Undetonated 37 and 75mm armor piercing projectiles, imbedded in the rear walls of the cleft, add further evidence to suggest that this area has received a significantly heavy bombardment which may have included ship based guns causing substantial collapse of the cliff face. On initial investigation of the cleft two small cave entrances were observed: A & B. Entrance B was found to be very shallow (1x2x1.30m [HxWxD]) and later was not considered to be part of the main U-type cave accessed through entrance A. It is most likely the rearmost remnants of a different cave that was destroyed by the shellfire that created the cleft. The outermost part of entrance A has been reduced in length by the bombardment of this area. When surveyed, this entrance was found to be south-east facing and reduced quickly from a comfortable 1.47x 2.80m [HxW]) to a much narrower, burrow-like crawl space (0.85x1.07m) that descended steeply over a very loose, sandy coral dust floor. Once this was traversed, the cave interior opened out into a broad (2.43m), high ceilinged (1.72m) main passage with two angular turns forming a U-plan. After 8.06m, the main passage turns back to the east but ends abruptly 2.11m after the turn. The presence of two chisels near the cave-end would imply that the cave was still undergoing construction work and was intended as a full U-type with a second entrance, but was never completed. A large compressed air canister may have fueled a jack-hammer for constructing the cave, examples of which are known to have been found in Peleliu caves (NARA: 127-306-C1-2). Two small niche/cubby holes have been hewn into the north wall, one by the entrance and one on the corner of the first turn.

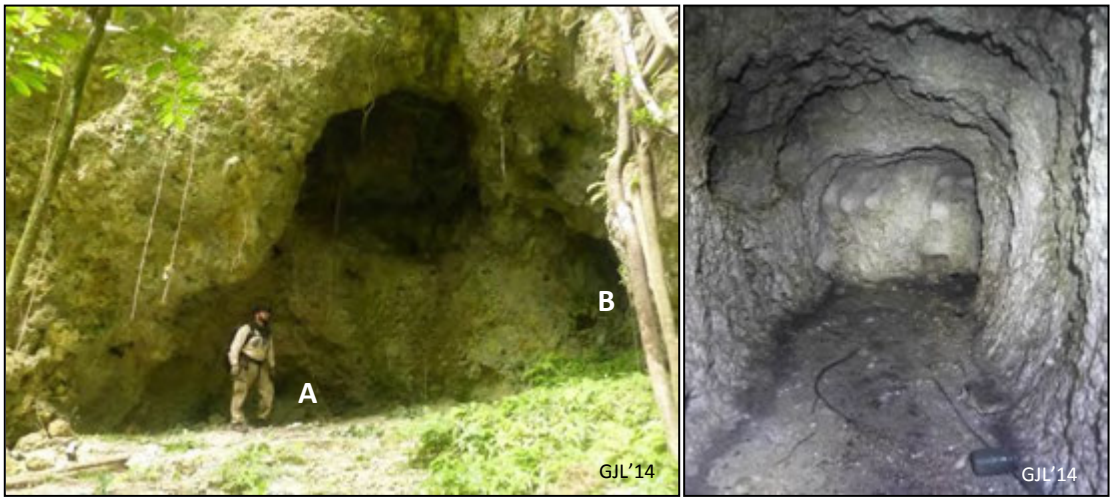


Figure 52 - AB14-024: cleft containing entrance A & B (left) & main passage (right)

Although an abundance of artifacts are spread throughout the cave, general deposition of ration cans, mess tins and water canteens towards the incomplete end of the cave would indicate that this area was used as a domestic/living area. Individual equipment items generally associated with IJ Officers, such as a soup dish and chopstick holder, were identified amongst an assemblage near entrance A that also contained leather boot soles and disarticulated human remains. A human rib was also found alongside some of the best preserved artifacts (notably including a rare signaling oil lantern) packed into clear plastic bags several meters outside of the cave within the open cleft area (Figure 53). Combined with the damp, spongy nature of the floor deposits within the cave and the loose fill in the narrow entrance passage, the cave would disturbingly appear to have been opened fairly recently with the particularly choice items being removed and prepared for collection later. The artifacts were removed from the bags to reduce the risk of deterioration from condensation prior to departure from the site.

Artifacts Noted:
several small, disarticulated human bones • fragments of various glass bottles • leather boot soles • compressed air canister • tunneling/cave construction tools • IJ mess kits & water canteen • food ration cans • undetonated IJ Type 97 hand grenade • IJ personal hygiene kit • IJN 'model 93' gas mask canister • IJ signal lantern missing oil burner base (would take type found in AB14-021) • complete US M1 Garand clip • expended US .50 cal cartridge

Figure 53 - AB14-024: artifacts prepared for collection (left), assemblage inside entrance A (top right), chisel & ration cans (bottom right)

AB14-025 Artificial Cave - Army Improved U-Type

An elaborate artificial cave located on the west side of The Horseshoe/Mortimer Valley which could equally be described as the lowermost eastern slope of Brother 4. Two entrances exist: the most northerly (B) being a lower personnel entrance (0.26x2.16 [HxW]) and the southerly, east facing entrance (A), being the main combat entrance (1.79x0.73m). Approximately 3m further north of B, and tucked around a turn in the vertical rock face, was a levelled coral rubble platform not dissimilar in form to site AB14-009 suggesting that it could have been used as a weapons platform for a mortar. Various fragments of detonated US ordnance and a US .30 cal ammunition box were observed near the cave entrances and large caliber projectile impact marks are visible on the rock face above them offering a stark reminder of the fierce fighting that ensued around these positions.

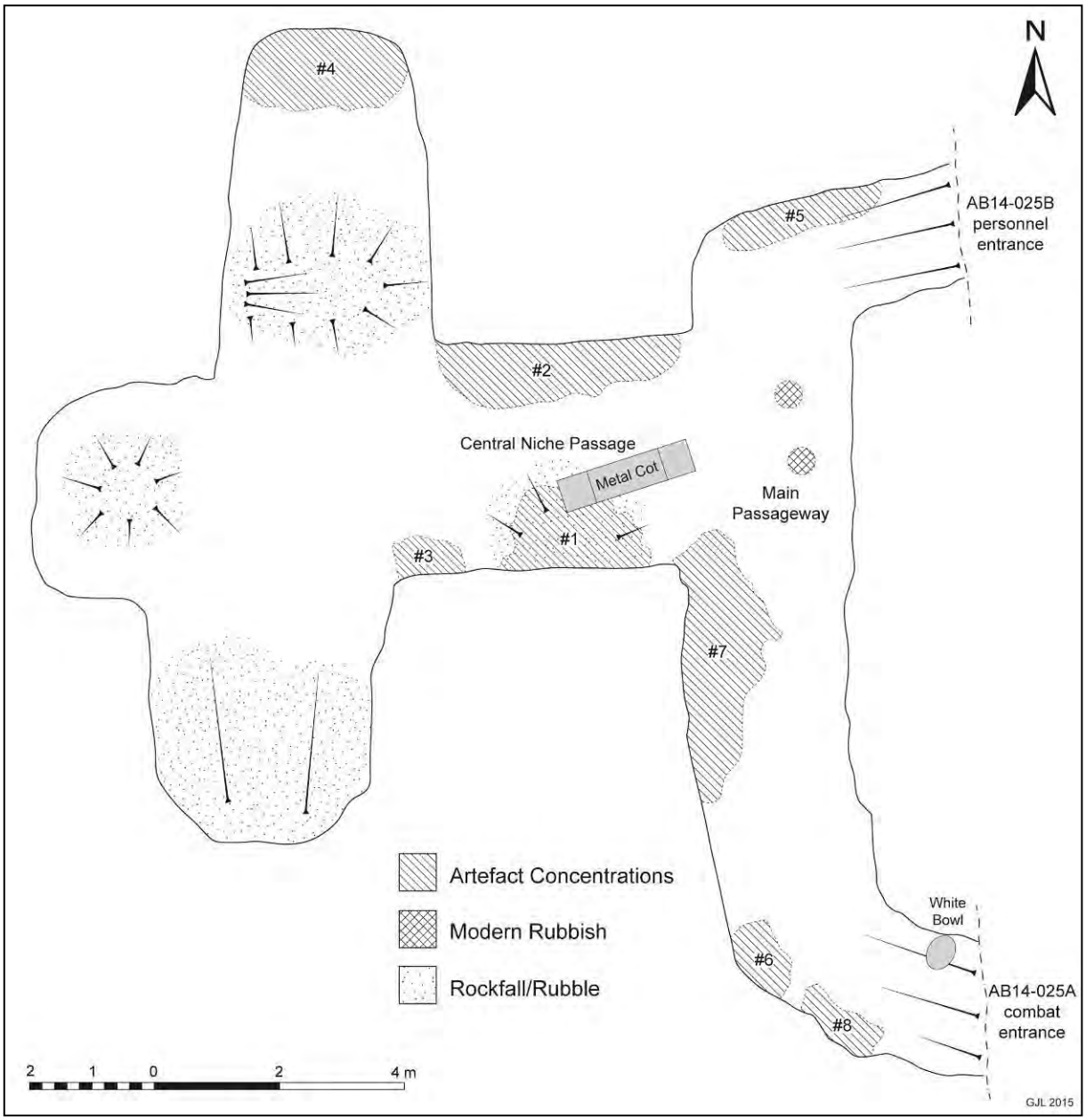


Figure 54 - AB14-025: cave interior floor plan

The interior of the cave is best described visually through the floor plan diagram (Figure 54) and would loosely conform to Phelan's 'efficient' U-type (Phelan 1945: 16) with squared corners to reduce the effectiveness of flamethrowers and a protective niche at the rear. However, in this case, the central niche has been substantially elongated and expanded into a second passage with further niches extending out from it to either side (Figure 55). With its broad, high, semi-vaulted passages (c.2-3x3m) this cave boasts a very unique architectural form which is almost a hybrid between the Army U-type and a Navy H-type.

Figure 55 - AB14-025: view through central niche passage toward rear niches showing assemblages

The preservation of artifacts within the cave is truly exceptional (Figure 56) and widespread, with little apparent disturbance other than several modern drinks cans in the main passage. Eleven individual IJ mess containers were counted offering an indication of the number of personnel that may have occupied the cave. All service respirator (gas mask) canisters encountered were of Army 'model 95' or '99' type suggesting personnel were Army as opposed to Navy. A polished tunic button, a broken fountain pen and leather boot uppers indicate that there had been at least one Officer amongst them. The majority of glass beverage bottles and mess kit items were found in the niches which likely served as the main living area. Assemblages were sufficiently intact to offer insight into how the cave had been

assaulted. The tell-tale flamethrower scorch marks on the walls, extended through the main passage as far as the angular turn into the central niche passage, highlight the effectiveness of the cave design in reducing the range of the primary US cave clearing weapon. Against the rear wall of the main passage, opposite the combat entrance, an artifact assemblage (#6) was found to contain fragments of human bone, IJ helmet and a pair of partially melted horn-rimmed spectacles; Shards of a US Mk3A 'Offensive' fragmentation grenade and two, fired US .30 cal projectiles located between the spectacles and the helmet fragments indicate how this individual lost his life (Figure 57).

Artifacts Noted (by assemblage #):
#1: collapsible cot • undetonated IJ Type 97 hand grenades • IJ helmet • IJA 'model 95' & '99' gas mask canisters • various glass bottles (sake-type and small clear) • x2 rice bowls • wooden planks **#2:** disarticulated human bones • various glass bottles (sake-type, small clear & amber) • pick axe head **#3:** x2 sake-type bottles • metal container lid **#4:** IJ mess kit • small glass bottles **#5:** IJA 'model 95' gas mask canister • IJ mess kit lid • broken short amber glass bottles **#6:** disarticulated human bones • IJ helmet fragments • IJ spectacles • US Mk3A grenade fragments • x2 US .30 cal projectiles **#7:** IJ helmet fragments • various buttons & fastenings IJ helmet fragments • medical phials (possibly cyanide & morphine) • various bottles • IJA gas mask components • IJ 6.5mm ammunition clip • unfired IJ 50mm Type 89 mortar bombs • chopstick holders • IJ personal hygiene kit • IJ leather boot uppers • broken porcelain **#8:** metal container lids • IJ mess kit lid • misc. twisted metal **Other:** metal rice bowl near entrance A • US illuminated mortar bomb casings outside cave • empty US .30cal ammunition box outside cave

Figure 56 - AB14-025: assemblage #7 with detail of medical phials

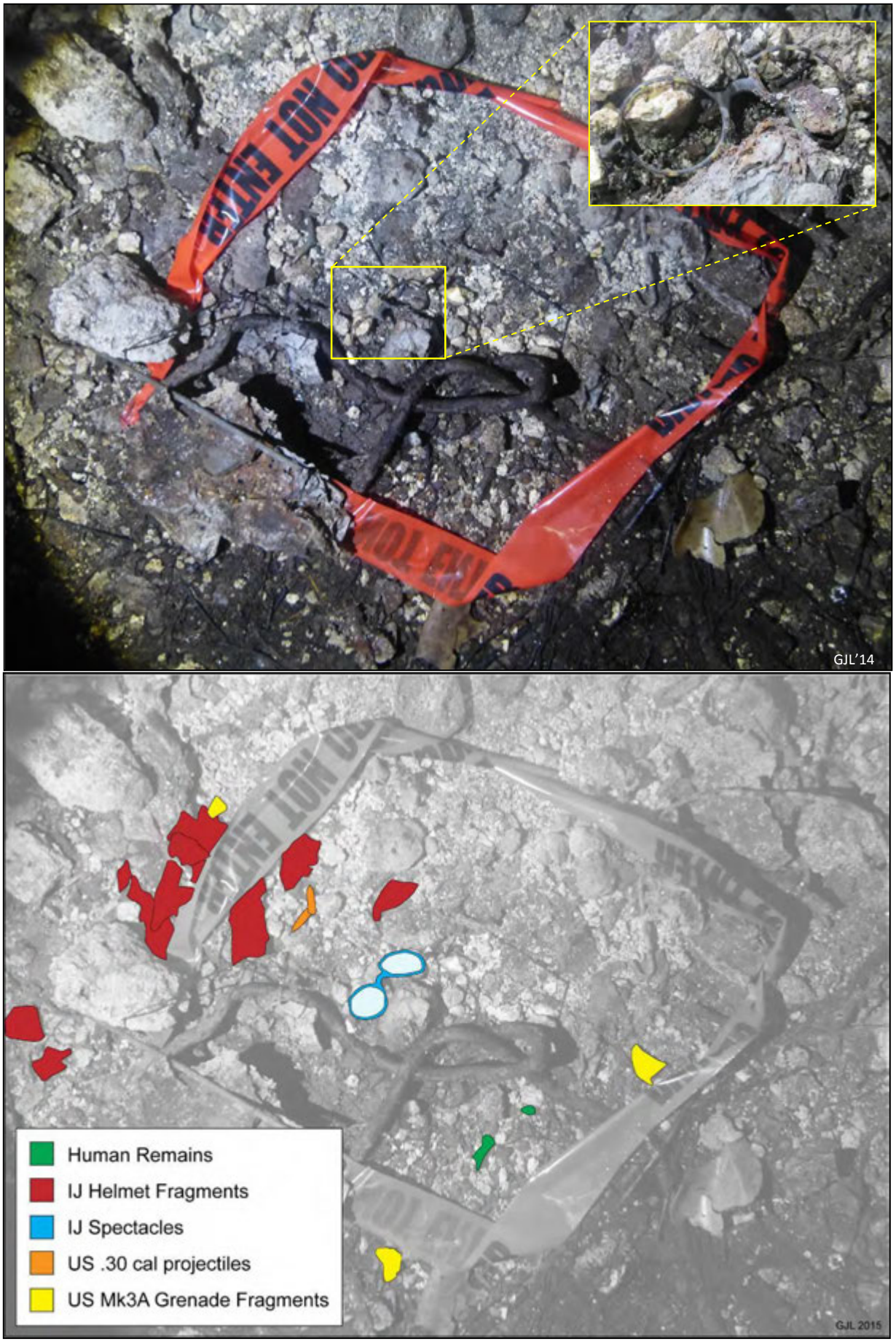


Figure 57 - AB14-025: assemblage #6 with detail of spectacles & feature schematic

AB14-026 Improved Natural Cave - Vertical Fault

This natural, vertical fault in the coralline limestone appears to have been minimally improved to form a concealed position for a large caliber artillery piece. The large opening (3.69x5.15m [WxH]) offers an unrestricted field of fire to the south with sufficient depth (15.09m) to accommodate the recoil of a large weapon and for a crew to load and operate it. A cache of 120mm projectiles were found towards the rear of the cave, three of which were visible on the surface with a strong potential for more beneath the loose rubble floor surface. This ammunition would imply that a Type 10 dual-purpose naval gun was emplaced here which would have had sufficient range to fire on the southern beaches and as far out as the reef edge.

The general condition of the cave indicates that it received a significant volume of counterbattery and small-arms fire. Loose, powdery coral rubble cascades from the entrance in an alluvial fan and the interior floor area is equally loose and rubble strewn. Collapse at the rear of the cave may have been caused by large caliber projectiles; fragments of the copper driving bands can be found across the floor. The north-west facing cave wall near the entrance is riddled with US .30 cal projectile impacts many of which remain imbedded in the soft rock. The impact marks are so clear, in fact, that it is possible to count full clips of 7 or 8 rounds of M1 Garand ammunition in the wall (Figure 58).

Artifacts Noted:
various IJ buckles & fastenings • unfired 120mm projectiles • rubber boot sole • timber fragments • IJN 'model 93' gas mask valve housing & lenses • US large projectile copper driving band fragments • US .30 cal projectiles

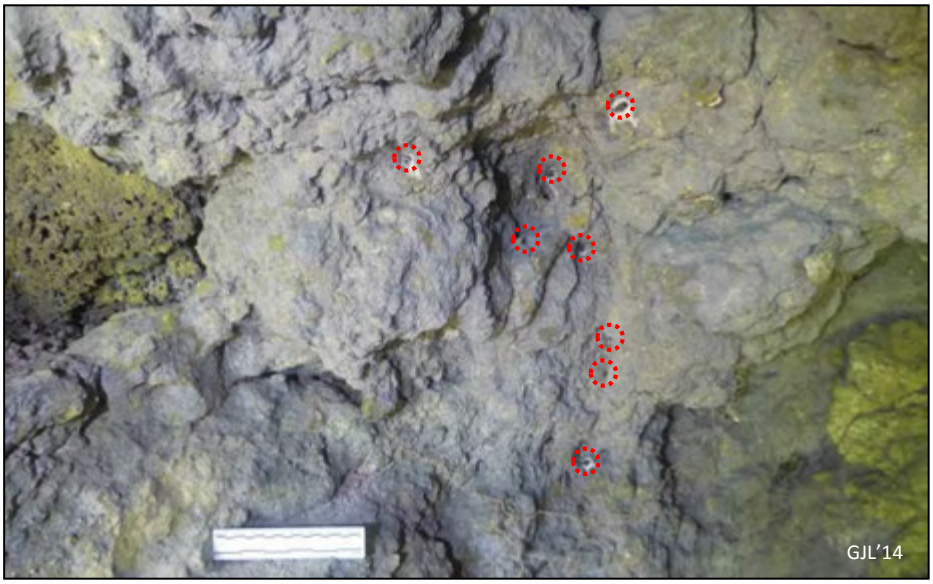


Figure 58 - AB14-027: spread of .30 cal projectile impacts in north-west cave wall

AB14-027 Natural Cave Rock Shelter

This small (1.15x0.94x1.28m [WxHxD]), south facing recess in the sheer western side of The Horseshoe/Mortimer Valley has not been enhanced in any way, but represents an important and often overlooked battlefield site type: the improvised defensive fighting position. Sites such as this one are little more that natural undulations in the terrain but they would have offered effective temporary concealment for IJ snipers to fire on exposed US troops. Located along trails between larger shelters and combat caves, these opportune positions would also have allowed IJ troops to move around the defenses without exposing themselves to observation and hostile fire for too long. Most of the sites are identifiable by the signs of return fire: such as in this case where US projectiles of various calibers are imbedded in the rear wall of the cave and above the entrance.

AB14-028 Artificial Cave - Army I-Type

A small, south-east I-type combat cave with an uneven entrance (0.57x1.57m [HxW]) which extends back 1.89m down a steep inward slope into a single, flat floored chamber. Similar in appearance to I-type examples on the opposite site of the valley with roughly finished walls and ceiling. No artifacts observed, but several small, US caliber projectiles are present, imbedded in the soft rock above the entrance.

AB14-029 Improved Natural Cave (Vertical Fault) - expanded to Army L-Type

An unusual cave type making use of a natural, vertical fault to form an entrance into what can best be described as an L-shaped combat cave where the main chamber is shallow but long, running parallel to the cliff edge. A bullet riddled metal storage drum to the south side of the entrance may have formed part of an improvised revetment wall at the lip of the steep downward inner slope which leads into the cave. This slope successfully masks the tall south-east facing entrance (1.39x2.15m [HxW]) from view. The 4.97m high fault forms a vaulted entrance area from which a 1.33m deep, 1.50m wide niche has been cut to the south-west and from which the main 9.20m long chamber extends to the north-east (Figure 59).

The cave contained an unusual array of artifacts which were largely contained to the main chamber area, although leaf litter at the entrance and in the niche prevented a thorough inspection of the floor. A single section of cast iron railway track and a crumpled piece of aircraft grade aluminum were, by far, the most unusual items and how, or why, they came to

by in the cave is unclear. The aircraft wreckage appears to be from the wing root area and surviving sections of the outer skin are heavily perforated, but a positive identification of origin has proven difficult. There is a slim possibility that it may be from TBM-1C Avenger 16956 and collected by IJ personnel from the jungle floor as a souvenir, but this is purely conjectural.

Artifacts Noted:
Bullet riddled metal storage drum • collapsed rubber tire at entrance • IJ spectacles • aqua-blue & clear glass bottle fragments • small disarticulated human bone near aircraft wreckage • aircraft wreckage • misc. rusted metal fragments • metal adjustment/gear/trim wheel • plastic tunic button • single chopstick • IJ mess kit • toothbrush handle • small strap buckle • bicycle type spoked wheel hub • large rice cooking bowl • cast iron narrow gauge rail

Figure 59 - AB14-029: main chamber looking north-east with detail of aircraft wreckage & chopstick

AB14-030A Natural Cave Rock Shelter

A small 2.46m deep depression in the rock face forms a potential improvised defensive fighting position with overhead protection from an overhang in the rock at the south-west

end. The rock shelter itself offers no direct evidence of combat, but is directly associated with a very large spread of material that extends c.8m down the slope into the valley from the site and continues along the cliff edge in front of it for c.20m (Figure 61). This spread includes 25 individual small finds and small find concentrations (SF#18-43) that range dramatically from offensive weapon related items to supply & provision equipment which are both IJ and US in origin (see small finds table at beginning of this section for descriptions). The assemblage contains two particularly rare and unusual items that are detailed below.

AB14-SF027 & 028 Barbeque Cooker and Stand

A very unusual find was half of a metal drum that appears to have been used as an outside cooker or barbeque (Figure 60). The drum itself has been custom-made for the task with roll-crimped edges and riveted handles, fitted at each end near the top to facilitate movement. A square section cross-frame was found a short distance away which appeared to have served as a stand for the cooker. As the spread of material in this area is incredibly mixed in this area it was not possible to determine whether this was an IJ or US item or, in fact, whether it relates to the battle period, earlier Japanese occupation of this area or later US activity.

Figure 60 - AB14-SF028: barbeque cooker and SF027 barbeque cooker stand

AB14-SF019 & 020 IJ Water Tanks,

AB14-SF030 IJ Water Filtration System Cylinder & Filters,

AB14-SF033 IJ Cast Iron Water Pipe & Survey Marker

Within the large material spread area of AB14-030, a considerable number of artifacts were identified which can be associated with fresh water provision. A pair of metal storage cylinders, one of which (SF020) was heavily crumpled and riddled with bullet holes, were the

first artifacts of this nature to be identified. SF019 was c.1m in length and c.0.40m in diameter with a single welded seam running its full length and a pipe valve extending from one end. An aluminum cylinder and several filters for a filtration system were the most distinctive objects located close to rock shelter AB14-030 (Figure 61). Finally, a long section of cast iron pipe aligned north-south, extending from near the foot of the cliff face downslope and perforated by shrapnel was identified. The pipe was next to a concrete survey marker, one of many seen along the lower east and west slopes of The Horseshoe/Mortimer Valley. The markers may have marked IJ trails, been part of the defense construction process or date to pre-war Phosphate mining activity. The water provision and purification artifacts are most likely associated with the two cisterns AB14-030B & C that were also found in this area and may represent a major stage in the Japanese fresh water provisioning system. References from communications between Colonel Nakagawa and Lieutenant General Inoue indicate that Grinlinton Pond was a major source of fresh water for the IJ defense force (USAHEC 1946b: 161-162): filtering, temporary storage and longer distance transporting of water from the pond, only c.40m downslope, to the widely dispersed troops would have therefore have been vital to maintaining fighting ability.

Figure 61 - AB14-030 natural rock shelter and AB14-SF029 water filtration system cylinder & filters

AB14-030B & C IJ Water Cisterns

Two vertical sided pits lined with concrete were identified near the natural cave rock shelter (B c.20m east and C c.38m south) and interpreted as water cisterns. B is rectangular (3x6m) and aligned downslope towards Grinlinton Pond while C is square in plan (4x4m). Dense undergrowth and rubble infill made it impossible to determine the depth but, where visible, both extended beyond 1m.

AB14-031 Artificial Cave - L-Type

A small cave facing east cut into the lower western side of The Horseshoe/Mortimer Valley. In keeping with its type, the entrance to the cave is small (1.27x1.45m [HxW]) and well concealed from the valley floor. The entrance opens onto a small, steep-sided knoll offering a strong defensive position and bullet riddled metal storage drums at the foot of the knoll indicate that it was once augmented by an improvised revetment wall. The single chamber has been roughly hewn with undulating walls, a flat floor and a smooth, even ceiling. It extends back c.4m with small shelf-like niches (0.74x0.42m [WxD]) set into the walls for storage (Figure 62) before turning north for 1.75m and terminating. Small handle-like metal angle bars have been set into the ceiling and rear wall and those near the entrance appear to have been well placed to aid access and egress. The presence of domestic items in artifact assemblages #3 & 4 at the rear of the cave suggest that this area served as the living quarters for the cave occupants. A cache of seven battery packs and a Bakelite adjustment knob in the center of the floor would indicate that a portable field radio had been in use here. Although the dimensions and build quality would indicate Navy construction, the presence of both Army and Navy material culture in the cave have made it difficult to ascertain which service this cave belonged to. It is, of course, possible that it was used by both as formal unit integrity began to be lost as the fighting wore on and positions previously cleared were reoccupied following the guerrilla tactics being employed.

Artifacts Noted (by assemblage #):
#1: IJ canteen lid • IJN powder-blue metal rice bowl • c.12 clips of live 6.5mm ammunition • small glass 'detector tube' (from an IJA or IJN gas detector kit) **#2:** cache of 7 radio battery packs • small plastic/Bakelite knob **#3:** IJA gas mask glass lenses and filter tube • IJ mess kit • crumpled metal drum **#4:** aqua-blue sake-type bottles • metal cooking/ration containers • **Other:** bullet riddled metal storage drums downslope from entrance • stacked metal tube sections in niche to north side of entrance (possibly for a carrying frame, cot or collapsible aerial) • misc. large metal object (possibly pack saddle or gun limber component)

Figure 62 - AB14-031: artifact assemblage #1 with detail of IJN rice bowl & gas detector tube

AB14-032 Caisson Assemblage

The remains of five IJA horse-drawn artillery caissons spread linearly along the cliff edge for 26m to the immediate south of site AB14-031. Four examples (locations A,B &D) have metal disc wheels, characteristic of the 37mm Type 94 'infantry rapid fire' gun (Figure 63). The fifth example (at C) has the standard artillery, iron shod, wooden wheels from which only the metal rims have survived (Figure 64). In all but one case, the metal chassis remains intact as do the vertical supports for the wooden side walls. The remains of two caisson carts are present at location B but one appears to be disassembled with only a single metal disk wheel and the central yoke visible. The second example at B was found with four spare parts cases in association (Figure 63). Three of the hinged cases were heavily disturbed but the fourth, which had been opened by a recent tree fall, and contained a large array of spares and tools. The caissons were most likely discarded as the field artillery pieces attached to them reached their intended point of deployment along the valley sides. Ammunition and any useful equipment in the caissons and limbers would have been unloaded and carried to secure ready-use areas with the superfluous, cumbersome carts left at the foot of the slopes.

Figure 63 - AB14-032B: caisson & spares/tool case

Figure 64 - AB14-032C (left) and AB14-032D (right)

Close examination of historic photographs taken of The Horseshoe/Mortimer Valley during the battle depict a landscape strewn with discarded military equipment and debris, some of which still survives and has been recorded during the 2014 survey. Two of the caissons from this assemblage are visible in one such photograph (Figure 65). The assemblage of caisson carts represents the second largest assemblage to be recorded on Peleliu and the first to be found on the jungle floor. This assemblage is also the first and only known of 37mm Type 94 caissons as other examples from storage cave AB14-111 are for the larger 75mm field artillery. As such, this site is of particular importance and rarity.

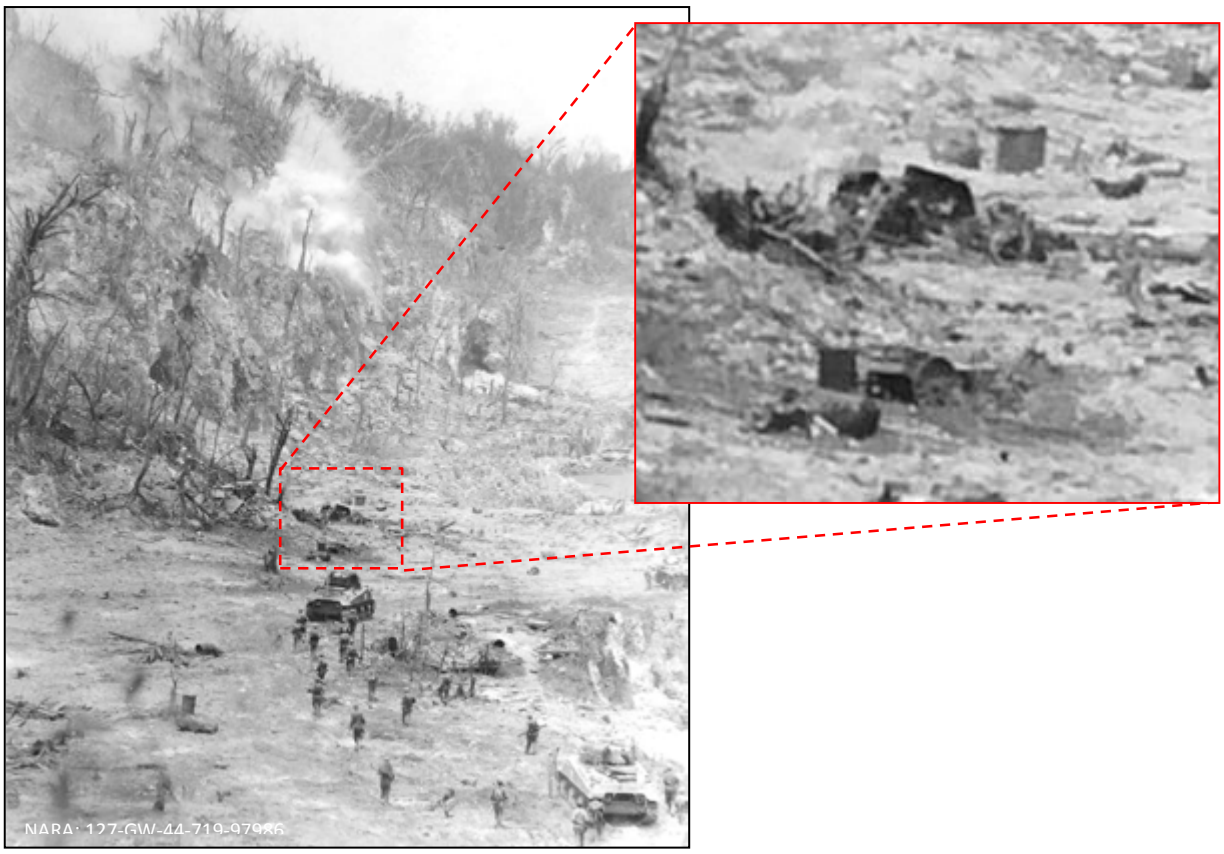


Figure 65 - AB14-032 caisson assemblage, September 1944

AB14-033 Artificial Cave - Army U-Type

A primary combat entrance and secondary personnel entrance located c.4m apart facing south on the western slope of The Horseshoe/Mortimer Valley. A high mound of coral rubble forms a firing slope at the main combat entrance as well as concealing the main passage from direct view. Both entrances are filled with rubble which fully seals them and only the first 2.06m of the top of the passage from the combat entrance could be examined. The personnel entrance was partially obscured by a large fragment of fallen coralline limestone which appears to have collapsed from the upper lip of the cave mouth, possibly during demolition works that sealed the cave. No artifacts were visible at the site.

AB14-034 Natural Cave Rock Shelter

A natural v-shaped recess in the vertical west slope of The Horseshoe/Mortimer Valley measuring 1.89x2.87x2.84m [HxWxD]. Loose rubble covers the base of the recess and impact marks from mixed US caliber projectiles are visible in the surrounding soft rock. Although no material evidence of occupation was found, the presence of the impact marks suggests that the recess was used as an improvised defensive fighting position, perhaps by an IJ sniper firing on advancing US troops below.

AB14-SF051 IJ Kendo Masks, Tent Stake & Cloverleaf Bundle Midcap

A small assemblage of artifacts was discovered in a slight hallow in the jungle floor, where a tree had recently been thrown by a storm exposing the coral rock below. A US angle iron tent stake and the midcap for an 81mm mortar bomb M43 type cloverleaf bundle were the most distinct artifacts visible, however, closer inspection also revealed two metal Kendo masks (Figure 66). The discovery of these masks is of particular interest as they offer an insight into the pre-battle routines of IJ personnel on Peleliu. Even during the frantic defense construction phases of the earlier months of 1944, these *bōgu men* face masks illustrate the discipline and continued training of IJ Officers in Kenjutsu (swordsmanship) which they would later apply in combat. Superior Private Iijima recalled one officer on Peleliu being an expert in Kendo: "*[The old soldier] stood up, urinating in the direction of the Marine lines, and shouted, 'Move forward. Do yourselves proud.' Then waving his sword above his head he charged head long into the antitank ditch. With a downward arcing overhead slash he cut down one Marine."* (Drea 2005: 59).

Figure 66 - AB-SF051: the first Kendo *bōgu men* mask (left) & second in context

AB14-036 IJ Defensive Fighting Position

A broad recess in the steep western slope of The Horseshoe/Mortimer Valley near where it joins Wildcat Bowl that has been augmented with a curving revetment wall of metal storage drums to form an improvised defensive fighting position. The open-topped rock shelter (3.78x1.60m [WxD]) features large caliber projectile impact marks on the rear wall with one

undetonated 75mm projectile visibly burrowed deep into the soft rock. The metal drums form a roughly semi-circular revetment perimeter of 12.57m. The drums are of two types, but of the same standard size, and are part-filled with fine coralline limestone rubble. The majority are perforated by bullet holes and shrapnel tears, and those on the south side of the revetment have collapsed (Figure 67). A large cast iron rice cooking bowl and a single railway track rail were found within the revetment. Approximately 2.60m south of the site, a mixed assemblage (B) of US 60mm illuminating and high explosive mortar bombs was located by the CGD team while sweeping the site perimeter. Slightly further to the east from this assemblage, a large fragment (2x1.30m) of what appears to be metal armor plate was identified amidst the dense undergrowth (C). The plate was heavily twisted and the surface covered with dents from multiple caliber impacts.

Figure 67 - AB14-036 metal drum revetment wall with rice cooking bowl in background

AB14-037 Material Assemblage

A large area of jungle (spanning c.14m north-east to south-west and 10.25m north-west to south-east) on the western side of The Horseshoe/Mortimer Valley below the entrance to Wildcat Bowl which was found to be densely covered in both US and IJ discarded military

equipment. The centers of the largest concentrations were recorded as separate locations and suffixed 'A-E'. Most notable was the chassis of a large engine at site A with identifiable generator, belt driven torque converter, pump and storage tank (Figure 68). On the upward and downward slopes, either side of the engine, large sections of cast iron pipe were observed. The combination of mechanical equipment and the pipe suggest a water pumping engine which could have been used by IJ forces to draw water up to sites in Wildcat Bowl from the large water source in the base of The Horseshoe/Mortimer Valley. The generator block, bonnet plates and all other components of the engine display small arms projectile impact marks and fractures caused by larger caliber, possibly mortar bomb, shrapnel.

Figure 68 - AB14-037A: IJ water pumping engine

Concentration B consists of a large assemblage of metal rims for standard IJ artillery, iron shod, wooden wheeled caissons or limbers. 22 individual rims were visible in this extensive, stacked pile which represents 11 individual artillery caissons or limbers (Figure 69). The stack shows little evidence of disturbance since it was created, however, it is unclear whether it has been an intended action by IJ troops prior to the invasion or part of a US led post-battle clearance event. Consultation of historical photographs, taken of this area in December 1944 (Figure 72), do not show this neat stack clearly which may indicate that the rims have been assembled in this fashion at a later date. In close proximity to the wheel rims are several caisson/limber axles but insufficient axles were found to serve all of the wheels.

Figure 69 - AB14-037B: caisson/limber metal wheel rim stack

Locations C & D largely consisted of mixed ordnance and associated carrying equipment: tail fin and body assemblies for US 60 and 81mm illuminating, smoke and high explosive (HE) mortar bombs were in the majority with a smaller number of unfired IJ 70mm and 75mm projectiles also present (Figure 70). At location E a Japanese metal tube section collapsible hand cart frame with rubber tires was found on its side (Figure 71).

Figure 70 - AB14-037C&D: mixed material assemblages

Figure 71 - AB14-037D: IJ collapsible hand cart

As discussed in previous site descriptions for this area, discarded, damaged and destroyed military equipment is prevalent across the western side of The Horseshoe/Mortimer Valley and can be seen in historical photographs taken during and after the battle. This material assemblage represents one such concentration that was visible, despite the thick undergrowth that now covers the lower slopes and base of the valley, and offers a broad representative sample of the kinds of artifacts that are thickly spread throughout the valley. Detonated and live ordnance, especially that from US mortars and IJ field artillery, continues to be a significant component of these assemblages. The similarity between the composition of this assemblage and AB14-038, situated c.4m higher up the slope at the entrance to Wildcat Bowl, is also worth noting and it is quite possible that some of site 037's assemblage has eroded down from 038 above.

AB14-038B and C Material Assemblage

Almost directly upslope from AB14-037 lies a further mixed spread of discarded military equipment. These were both located to the south-east of a previously recorded 70mm Type 92 Battalion Gun which is discussed separately in Section 3.2 (AB-14-037A / AB126). Two distinct concentrations were identified; the first (B) consisting of eight stacked metal wheel

Figure 72 - Sites on the western slopes of The Horseshoe/Mortimer Valley

rims from IJ wooden wheeled, iron shod artillery caissons/limbers. Fragments of metal IJ ammunition packing containers, for storage of 70mm projectiles, were identified within this concentration (Figure 73) and it is likely that these are associated with the Type 92 Battalion Gun at A. The cast iron water pipe recorded at the base of the cliff (AB14-037) also crosses this area, aligned east-west, and is clearly visible on the surface. Material assemblage concentration C is located c.3m south-south-east of B and consists of US M140A1 packing containers and six metal railway sleeper clamps. The containers vary greatly in completeness and general condition, are square in section and would have held four 81mm HE mortar bombs in individual fiber containers (Figure 74).

Figure 73 - AB14-038B: IJ 70mm projectile metal packing container

Figure 74 - AB14-038C: US M140A1 81mm metal packing containers

Although metal containers were the standard method of packing 60mm and 81mm mortar bombs for shipment (War Dept. 1945: 92), the more prevalent packing type observed on Peleliu during the 2010 and 2014 fieldwork has been the cloverleaf bundle; metal containers

have only been identified in the southern end of Wildcat Bowl. Historical photographs appear to substantiate this dominance as the majority of images depicting mortars and larger caliber field artillery in operation show cloverleaf bundle packaging nearby. This may indicate a preference for the lighter weight and greater portability of the metal capped fiber containers over the fully metal containers by units operating in the rugged interior of Peleliu.

AB14-039A Natural Cave Rock Shelter

A reasonably wide (2.22m) but shallow (1.54m) recess in the sheer rock face joining Wildcat Bowl to The Horseshoe/Mortimer Valley. The shelter is located directly above AB14-036 and likely served as a sniper or observation position for IJ troops. Damage to the rock face caused by large caliber projectile impacts and imbedded shrapnel is visible around the cave mouth. The tip of a 75mm armor piercing (AP) projectile was found c.5m, north-north-east of the site, further along the narrow railway cutting ledge that serves as access to the rock shelter.

AB14-040 Natural Cave Rock Shelter

This natural recess is situated in a highly precipitous section of the western slope of The Horseshoe/Mortimer Valley and faces east. It is 3.16m deep, 1.43m wide at the entrance and 1.34m high with a loose powdery rubble floor, irregular walls and ceiling. Two IJA shovel blades were observed: one in the cave and the other partially downslope of the entrance. A cartridge baseplate, possibly from an IJ 75mm projectile was also evident in the cave. Extensive blast damage and impact marks from large caliber projectiles can be seen around the entrance to the rock shelter and two undetonated US 75mm projectiles are visible imbedded in the rock face 3m north and 1m higher up than the cave mouth. The rock shelter is much deeper than other examples encountered and is more similar in form to the artificial I-Type caves noted on the opposite side of the valley. The site may therefore represent a hybrid combat cave where a natural fault in the rock has been exploited and hastily expanded, perhaps with an explosive charge, to create more effective horizontal and downslope concealment for a sniper or observer positioned here.

AB14-041 Natural Cave Rock Shelter

This site is located approximately 3m above and slightly south of cave AB14-040 and was accessed for survey with the aid of a rope safety line up the vertical cliff face (Figure 75). A low, wide, east facing cave mouth (0.85x1.55m [HxW]) opens into a small, low ceilinged front

chamber with naturally undulating walls and dipping rubbly floor. From this chamber a low, uneven passage (0.54x1.47m [HxW]) leads into a larger natural chamber (1.14x2.04x3.89m [HxWxD]) which has no floor surface to speak of and consists instead of jagged columns of coralline limestone rising up from deep fissures and cracks to meet stalactite-like columns descending from the ceiling. The cave appears to be formed entirely through natural water erosive processes and contained no evidence of human activity. The front chamber contained a small fragment of projectile copper driving band and US .30 cal projectiles imbedded in the rear wall. The corroding remains of a US 75mm AP projectile were also noted on the floor of the front area. Although the cave offers no evidence of occupation by IJ personnel, the inner chamber and low passage would have offered excellent concealment as well as protection from the fire that has been directed at the forward chamber. It may therefore have served as an improvised defensive fighting position or shelter.

Passage between chambers

Forward Chamber

Rear Chamber

Figure 75 - AB14-042 Natural Cave Rock Shelter

AB14-042 IJ Field Artillery Battery Wagon Caisson and Limber

A pair of large caisson and limber wagons located near the bottom of a downward slope. Both examples have the same IJ standard artillery metal shod, wooden wheels with only the hubs and metal rims surviving. The largest and most complete artillery wagon (A) is aligned north-south and of an entirely metal construction, measuring 1.07m wide by 1.90m long, with a heavy towing arm connected to the chassis (Figure 76). One seat survives on the forward top section of the main body and is of a distinctive part filled, part open bucket design. The main body is of a long rectangular form making it characteristic of a caisson rather than the shorter limber carts. Top hinging doors in the front and rear bulkheads open to reveal a square gridded metal shelving to accommodate removable square ammunition or tool containers. The main central area of the caisson is open with no compartmentalization allowing the cart to serve like a trailer and accommodate larger ammunition packing containers or bulkier equipment items. The closest historical photographic match found for this type of caisson refers to it as being part of a horse-drawn field artillery battery wagon pair alongside a limber (Figure 77). Battery wagons of this type are described as being used to transport general artillery equipment which may have included items such as range finders, binoculars, telescopes, communications equipment and tools (War Dept. 1944c: 296). This example is heavily perforated by small arms impact holes and shrapnel tears. Wagon B was smaller at 1.14m long and 1.10m wide (including axle hubs), was heavily overgrown impeding close investigation and is in a much poorer condition. It is most likely the limber wagon that would have paired with caisson A to form the battery wagon set.

Figure 76 - AB14-042A: battery wagon caisson

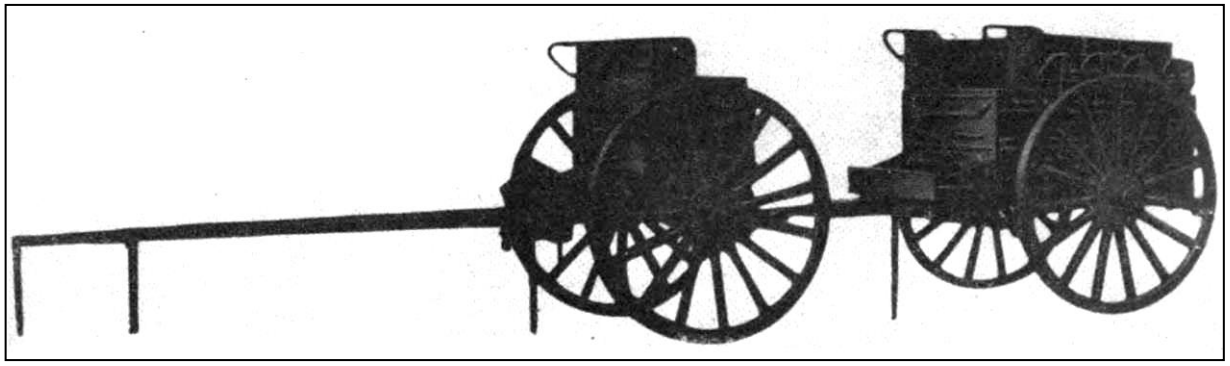


Figure 77 - Battery wagon for field artillery: limber (left) & caisson (right) (*ibid*.: 297)

AB14-043 Natural Cave Rock Shelter

A wide but shallow crescent shaped recess (3.70x1.49x1.37m [WxHxD]) at the base of a vertical cliff face that forms part of the base of Hill 300. A fine coral dust rubble creates a fairly level floor surface on which a single human fibula and metatarsal were found. The rear of the recess and the soft rock above it display impact marks from large caliber, possibly US 75mm, projectiles. This recess could have served as a temporary shelter or improvised defensive fighting position for either US or IJ personnel moving along the base of the cliff.

AB14-044 Artificial Cave - Navy U-Type

Situated at the base of Hill 300 with commanding views out across the mouth of The Horseshoe/Mortimer Valley, this u-shaped cave is one of the best quality artificial cave constructions recorded during PAS'14. The main combat entrance has been set back into a natural, vertical recess in the sheer cliff face with a significant rubble mound revetment to its front. The combination of these two features provides excellent concealment and complete protection from flat trajectory fire until the top of the mound has been gained. The unassumingly rough, natural A-shaped cave entrance (2.74x2m [HxW]) descends through a short passage (1.85m) before opening into an expertly carved central passage/chamber which runs parallel to the cliff face for 14.56m. This main passage is rectangular in section, 1.63m high, with nearly vertical, evenly hewn walls and a smooth, level ceiling (Figure 78). Small, shallow storage niches (including one for a candle) are visible at the south-west end nearest to the main combat entrance with larger niches at each end of the main passage formed by the in-stepping of the two entrance passages. The personnel entrance and associated passage are partially sealed with rubble, much narrower (1.64m narrowing to 1.26 at the mouth) than the main combat entrance and much lower (0.54m). The quality and general architecture of the cave conforms to the U-type of combat caves that were built by

the IJN (Phelan 1945: 4 & 10) indicating this to be a Navy built cave, possibly excavated by men of the 214th Naval Construction Bn (*Setsueitai*) or the Korean laborers of the Kobayashi Labor Force (*Setsubutai*) (Camp 2011: 38).

Figure 78 - AB14-044: main passage looking north-east from combat entrance passage

In addition to the noteworthy construction quality, this cave also possesses an extensive, exceptionally well preserved and largely undisturbed material assemblage (Figure 81). Even before entering the cave, a large array of artifacts is visibly spread around the earth revetment mound and down the inner slope towards the mouth of the combat entrance. Of particular interest is an IJ Type 91 fragmentation hand grenade which was found tucked into a convenient shoulder-height niche, to the south of the entrance; its safety cap and pin were removed, ready for use. Artifacts can be found spread throughout the full length of the main chamber with 12 individual concentrations recorded during the survey (see Figure 79 for locations). Analysis of the material assemblages suggests that the cave was occupied by a mixed force with both Army and Navy respirator (gas mask) components and Navy uniform fastenings present. Seven mess kit containers were identified in association with this site suggesting at least this number of individuals had once occupied the cave. The majority were

found towards the north-eastern end of the main passage in assemblages that also included water canteens and a rice bowl (assemblage #1 & 4) indicating that this part of the cave was used as living quarters.

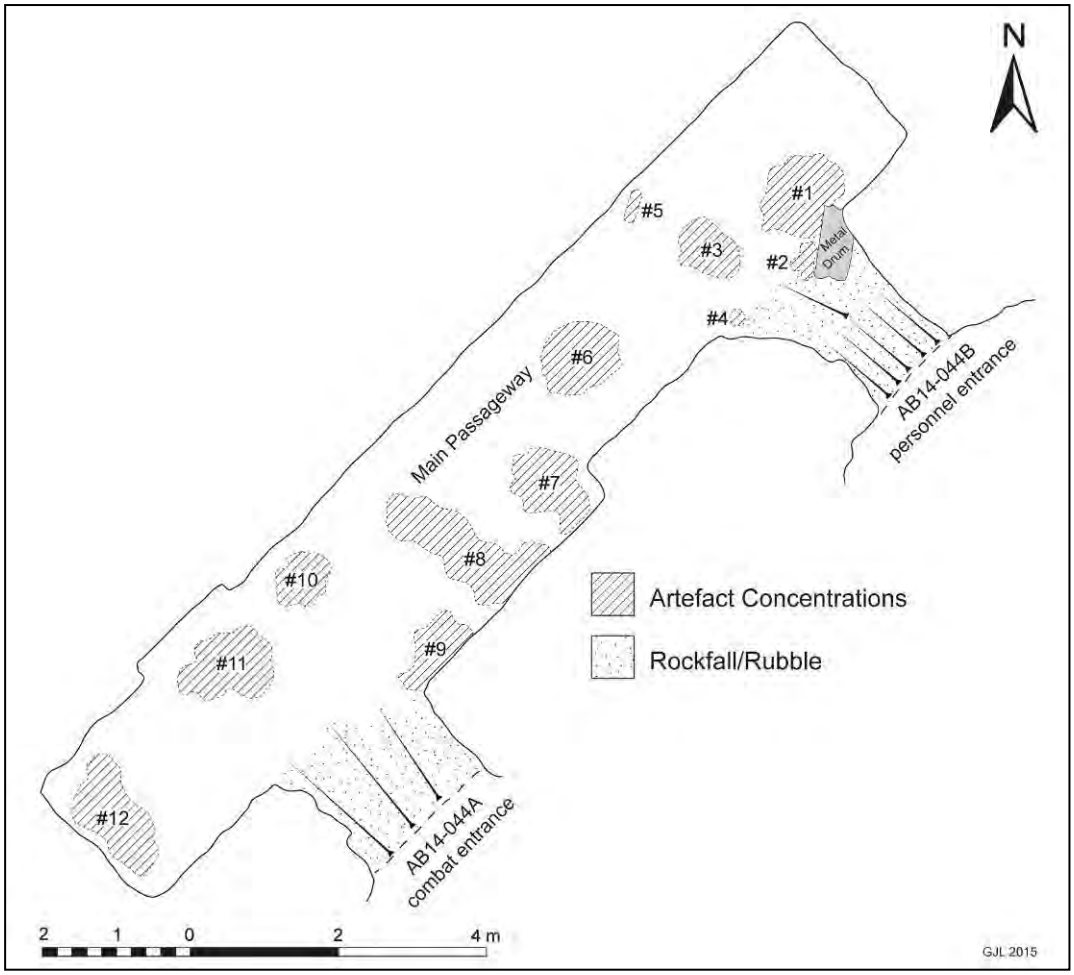


Figure 79 - AB14-044 cave interior floor plan sketch

Sections of the mounting/carrying frame for a 7.7mm Type 92 'Hotchkiss-type' HMG, a sixty-round drum magazine for a 20mm 'Oerlikon-type' canon and a 37mm cartridge case (assemblage #1,7, 9 & 11) would indicate that a range of heavy weapon types may have been fired from the revetment mound at the combat entrance. A range ruler located close to the 37mm cartridge case was found to have a Japanese inscription carved into its surface. A translation of the inscription revealed that the ruler belonged to a Corporal Tejima Yoshiro, of the 3rd Artillery Company, 3rd Bn, 15th Infantry Regt. This evidence would confirm the use of this Navy constructed cave by Army personnel, possibly a 37mm gun crew. No flame thrower scarring was found on the cave walls but partial, localized charring of some of the artifacts was evident. Four concentrations of disarticulated human remains and an undetonated US Mk2 fragmentation grenade at the mouth of the combat entrance would suggest that the cave had been cleared manually using grenades. A chrome plated IJN

officer's belt buckle (Figure 80), ornate buttons, range ruler and personal items associated with the IJA and IJN officer class also point to the presence of at least one officer in the cave during the fighting. However, due to the disarticulated nature of the human remains it is unclear whether the remains in close proximity to the higher ranking items belong to officers.

Artifacts Noted (by assemblage #):
#1: x3 IJ water canteens • IJ range ruler • x2 IJ mess kits • rubber shoe soles & boot uppers • glass bottle stopper • clips of 6.5mm ammunition • IJ curved magazine from 6.5mm Type 96 LMG • IJ 37mm HE incendiary projectile cartridge **#2:** IJ soap dish • various uniform buckles & clasps **#3:** IJ leather ammo pouch fragments • metal match box holder • needle case • IJA 'model 99' gas mask lens & tissot tube fragment • broken bottle glass fragments • charcoal/burnt material • small clear glass phial **#4:** rice bowl **#5:** single leather boot **#6:** disarticulated human bones • IJ 6.5mm ammunition clips & 7.7mm single ammunition • IJ leather ammo pouch • small amber glass bottle **#7:** disarticulated human remains • IJA gas mask anti-fog discs • IJ mess kit lid • IJN Officer's belt buckle • various uniform/equipment buttons, buckles & fasteners • x2 IJ mess kit containers • small amber glass medical phial • mirror • 20mm 'Oerlikon-type' drum magazine #**8:** x2 IJN gas mask canisters • IJ mess kit • IJ strap end & buckle • leather boot fragments & heel • IJA gas mask lens • broken bottle fragments including a sake-type bottle base **#9:** small disarticulated human remains • corroded ERW • 7.7mm Type 92 HMG mount fragment • IJ Type 93 mine casing **#10:** IJ gas mask tissot tube fragment & canister visible beneath rock **#11:** IJ mess kit lid • metal mesh wire • cast iron pick axe head • 7.7mm Type 92 HMG mount fragment • IJA 'model 95' & '99' gas mask canisters **#12:** combat boot soles • IJ buckle • IJ shovel blades • various expended small arms cartridge cases **Outside Combat Entrance:** IJ mess kit container • US illuminated & HE mortar bomb casings • undetonated US Mk2 and IJ Type 91 hand grenade

Figure 80 - AB14-044: material assemblage #7 showing detail of IJN belt buckle

Assemblage #8

Assemblage #7

Assemblage #5

Assemblage #1

Figure 81 - AB14-044: selection of material assemblages along the main passage

AB14-045 Natural Cave Rock Shelter

Although very small, this improved natural cave is reminiscent of the balcony-type in that the IJ forces have exploited a natural cavity in the rock face to form a V-plan fighting position which extends around a corner offering observation and firing opportunities in a wide arc from north-east to south-east. The rock face at the north-east side of the east facing entrance provides a firing parapet, and to the south-east, coral boulders have been positioned to create a second parapet. At 2.61m in depth and 7.96m long, the position closely resembles a fire trench offering little enclosed protection. As such this site may have served purely as a firing position with longer term shelter provided by nearby caves.

Smalls arms projectiles imbedded in the rear walls, distinctive burn residues above the entrance (Figure 82) and melted glass fragments indicate that the site was subjected to attack from infantry supported by a flame thrower. The majority of artifactual material was discovered just outside the entrance break in the firing parapet and included an IJA 'model 95' gas mask canister and eye lens signifying the presence of army personnel at this site. A larger concentration of artifacts were noted a short distance downslope from the cave mouth and were recorded separately as AB14-SF059 & 060, but most likely originated from this site. These two assemblages included items such as an IJ 6.5mm Type 38 'Arisaka' rifle trigger guard, metal rimmed spectacles, a uniform button, a metal equipment buckle and a second IJA gas mask eye lens (Figure 83).

Artifacts Noted:
IJA 'model 95' gas mask canister and eye lens • aqua-blue melted & unmelted glass fragments • aqua-blue ink bottle • amber glass bottle neck fragment • small cream glaze porcelain cup fragment • misc. small metal fastening plate

Figure 82 - AB14-045: general rock shelter views with ink well and cream glaze porcelain cup details

Figure 83 - AB14-SF059: IJ 6.5mm Type 38 'Arisaka' rifle trigger guard & AB14-SF060: metal rimmed spectacles

AB14-046 Natural Cave Rock Shelter

A wide but shallow natural recess (0.77x2.44x1.12m [HxWxD]) high up in the vertical face of Hill 300 forms a small shelter with broad panoramic views from north-east to south. The site could have served as an effective observation post or improvised fighting position for an IJ sniper. The base of an undetonated US 75mm projectile is visible through a 2m deep hole which it has formed in the rear wall of the cave. Shrapnel fragments are also to be found in the soft rock and on the floor area of the shelter.

AB14-048 IJ Defensive Fighting Position

At the foot of the plateau to the south of Hill 300, a substantial coral rubble and earth embankment was noted. The J-shaped parapet is 1.41m high and follows the natural curve of the vertical cliff face 2.50m to the west of it (Figure 84). A dog legged access trench 4.30m long cuts through the embankment at the midway point of the long axis. Modern garbage was observed within the enclosed area of the site and a large quantity of rusty twisted metal, corrugated iron sheeting, wheeled cart components, narrow tread rubber tires and a metal storage drum were also present. A sixty-round drum magazine for a 20mm 'Oerlikon-type' canon sits on the top of the south-east turn of the parapet and may be indicative of a weapon of this type being positioned here.

Figure 84 - AB14-048: IJ defensive fighting position looking south-east

AB14-050 IJ Defensive Fighting Position

The most southerly site recorded as part of The Horseshoe/Mortimer Valley survey, this shallow rectangular pit (2x1x0.50m [LxWxD]) has been cut into the cliff edge and augmented with coral rock boulders to form a parapet on three sides. A number of miscellaneous twisted metal fragments were found in association with the site but no other characteristic artifacts were observed. Given the deliberate nature of its construction and broad viewsheds from north to south-east, it is likely that this served as an IJ position, possibly a forward observation post, used to monitor troop and vehicle movements to the south and east and for offering early warning to heavier anti-infantry and anti-tank positions of advancing hostile forces.

3.0.4 The Airfield & Southern Ridges

PAS'14 Site #	Site Description
AB14-106	IJ Concrete Anti-Tank Casemate
AB14-109	Artificial Cave (Army I-type)
AB14-113	Japanese Pre-Battle Military Burial Ground

AB14-106 IJ Concrete Anti-Tank Casemate

A large concrete emplacement was identified on the west side of the modern vehicle track that runs between the current landing strip and Ngerdelolk village. The structure has been completely enveloped by the root system of a large Banyan tree which inhibited accurate measurement and assessment of the building (Figure 85). Where adequate gaps allowed, the structure was seen to be roughly rectangular in plan (c.6x5m) and chiefly constructed of concrete. Two embrasures, approximately 1.50-2m wide, were observed in the east and west facing elevations respectively. A camera was successfully extended into the structure to assess the interior which was found to be almost completely infilled with rubble. Where visible, the ceiling and interior walls showed evidence of a shutter casting method of concrete pouring using timber boards. No artifactual material was in evidence.

Figure 85 - AB14-106: enveloped by Banyan tree roots

Investigation of historic archive sources following fieldwork revealed photographs, schematic drawings and written descriptions of an IJ pillbox and anti-tank (AT) casemate located opposite each other in the immediate vicinity of this site (NARA: 127-306-C1-2). Examination of the schematics and location sketches indicate that AB14-106 is most likely the AT Casemate which originally housed a 37mm Type 94 'infantry rapid fire' gun positioned to protect the approach road from the airfield to the Radio Direction Finding (RDF) complex, further to the east (site: AB001 recorded in 2010). A significant wedge shaped recess exists in the centre of the west elevation of the casemate where the concrete embrasure is shown on 1944 photographs (Figure 86 & 87). This may indicate the destruction of the outer part of the embrasure following the 1944 recording of the site, either to render the emplacement unusuable or to facilitate the removal of the artillery piece from inside. The width of the innermost part of the embrasure shown in the plan diagram (Figure 87) is consistant with the surviving rectangular hole that is just dicernable through the roots covering this elevation.

Figure 86 - AB14-106: west facing elevation showing main embrasure Oct.1944 (left), Dec.2014 (right)

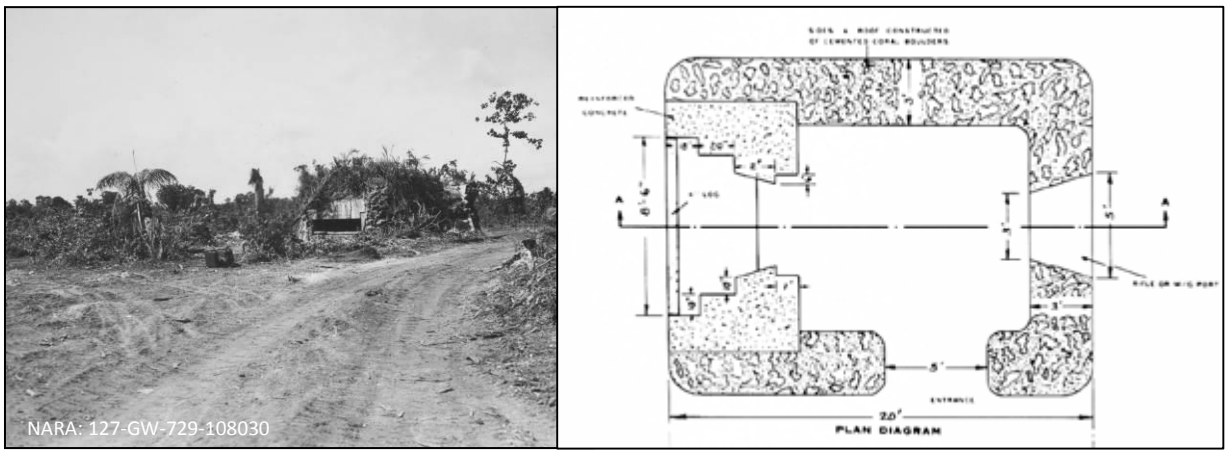


Figure 87 - AB14-106: west facing elevation & plan diagram (NARA: 127-306-C1-2), Oct.1944

AB14-109 Artificial Cave - Army I-Type

Whilst conducting a resurvey of storage cave AB14-111 (AB145), this small Army I-type cave was brought to the attention of the UoA team by members of the CGD team checking the wider cave environs. It is located a short distance to the south-west of AB14-111 and consists of a roughly rectangular, vertically sided entrance (1x0.5m) which opens into a single small rock cut chamber (3.60x1.84m). Unusually, one entire side of the cave (south-east side) appears to have been constructed from reinforced shutter-cast concrete. A pair of small embrasure loop holes have been molded into the concrete wall offering a narrow but deep field of fire down the slope to the south-east. The concrete augmentation extends into the cave interior forming the lintel and one side of the entrance, a vaulted ceiling above the loopholes and an angled firing platform which could accommodate an HMG tripod. A substantial metal mounting bracket has also been set into the firing platform and aligns with the westernmost loophole (Figure 88).

A historical photograph unearthed at NARA depicts a tripod for a 7.7mm Type 92 'Hotchkiss-type' HMG aligned with the easternmost loophole and a sixty-round drum magazine for a 20mm 'Oerlikon-type' canon sat next to the fixed mounting at the western loophole (Figure 88). This evidence would suggest that this cave had a dual anti-personnel and anti-tank role and was sighted to protect the approaches to the storage caves further north. The historical photograph also shows a wide array of artifacts across the firing platform and entrance passage. The absence of these objects from the cave in 2014 is testament to the scale of looting that has taken place since 1944.

Artifacts Noted:
small assemblage of miscellaneous metal fragments located against rear (west) wall • IJA gas mask parts • possible large ration can • possible IJ detonator • possible metal fragments of HMG tripod

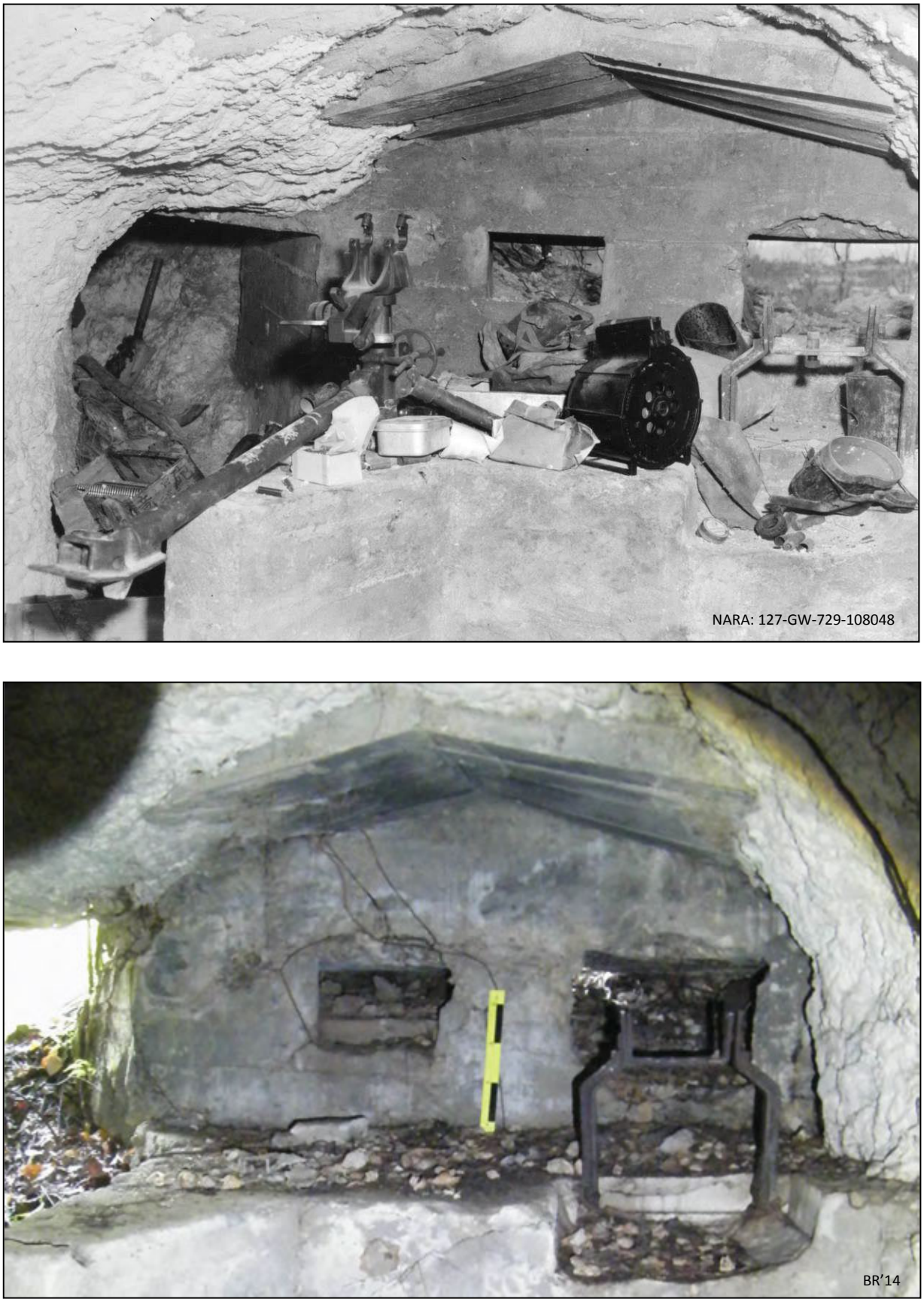


Figure 88 - AB14-109: interior view showing concrete and embrasures in south-east wall, October 1944 (above) and December 2014 (below)

AB14-113 Japanese Pre-Battle Military Burial Ground

Following a close examination of historic photographs from NARA, two images were identified that appeared to depict a row of five Japanese grave markers. The possibility of rediscovering lost Japanese war graves was considered of very high importance and, as a result, considerable effort was made to locate the site. Through comparing distinctive landscape features found in the background of one of the images with historic oblique aerial photographs, it was possible to determine an approximate location and in early 2015 the Knecht and Price, accompanied by McQuillen and BAC staff Sunny Ngirmang, Calvin Emersiochel and Errolflynn Kloulechad, conducted a ground search. Although no grave markers were found, the prominent, large coral boulder seen in NARA image 127-GW-47-739-96120 (Figure 89) was successfully located and c.16m north of that a roughly rectangular area of levelled coralline limestone rubble was identified with a shallow terrace or stepped western edge (Figure 90). The shallow terraced step would appear to match a similar feature that the grave markers are shown to be set into in the historic photographs. The northern and southern extents of the site are marked by lines of coral rocks running east to west. Similar features are visible in NARA image 127-GW-46-735-97033 (Figure 91) to the north and south of the grave markers. Lengths of twisted US communications cable were found within the level platform area of a similar type to the wire seen to be wrapped around the grave markers (Figure 90).

Figure 89 - AB14-113: site area looking south, Sept. 1944

Figure 90 - AB14-113: low terrace edge (left) & US Communication Cable (right)

Figure 91 - AB14-113: site in use as a CP, looking east, Sept. 1944

Through the initiative of McQuillen, translations of the grave marker inscriptions visible in NARA image 127-GW-47-739-96120 were acquired revealing that five individuals were represented by the markers, all of whom were interred between April and August 1944, prior to the Battle of Peleliu (Figure 92). This information indicates that the site is a small pre-invasion Japanese military burial ground and not a mass war grave associated with the battle.

Establishing the exact cause of death of the five IJA personnel has not been possible from consultation of available archive materials and may be unachievable without intrusive scientific investigation. However, the dates of interment may indicate that the soldiers could have died from injuries sustained during the bombing raids conducted by US carrier and land based aircraft in March, July and August 1944. It is equally conceivable that the deaths were a result of illness or accident and that the correlation between the air raid dates is coincidental.

Figure 91 depicts the area around the site as being actively used by US forces during the battle. First Sergeant Ainsworth of *Charlie* Company, 1st Bn, 1st Marine Regt describes in his diary how the Company Command Post (CP) was located in this area on 17th September (D+2): *"Company headquarters is just back of the pass and off to the right side of the road in an area, which looks as though it had been recently evacuated...We in the CP can step out to the road and look several hundred yards into enemy territory"* (Ainsworth 2012: 33). Communications personnel and temporary shelters, visible in the foreground of NARA photograph 127-GW-46-735-97033, as well as lengths of communications cable, found across the site area during the survey, likely relate to the use of the site as a CP on or around the 17th September 1944.

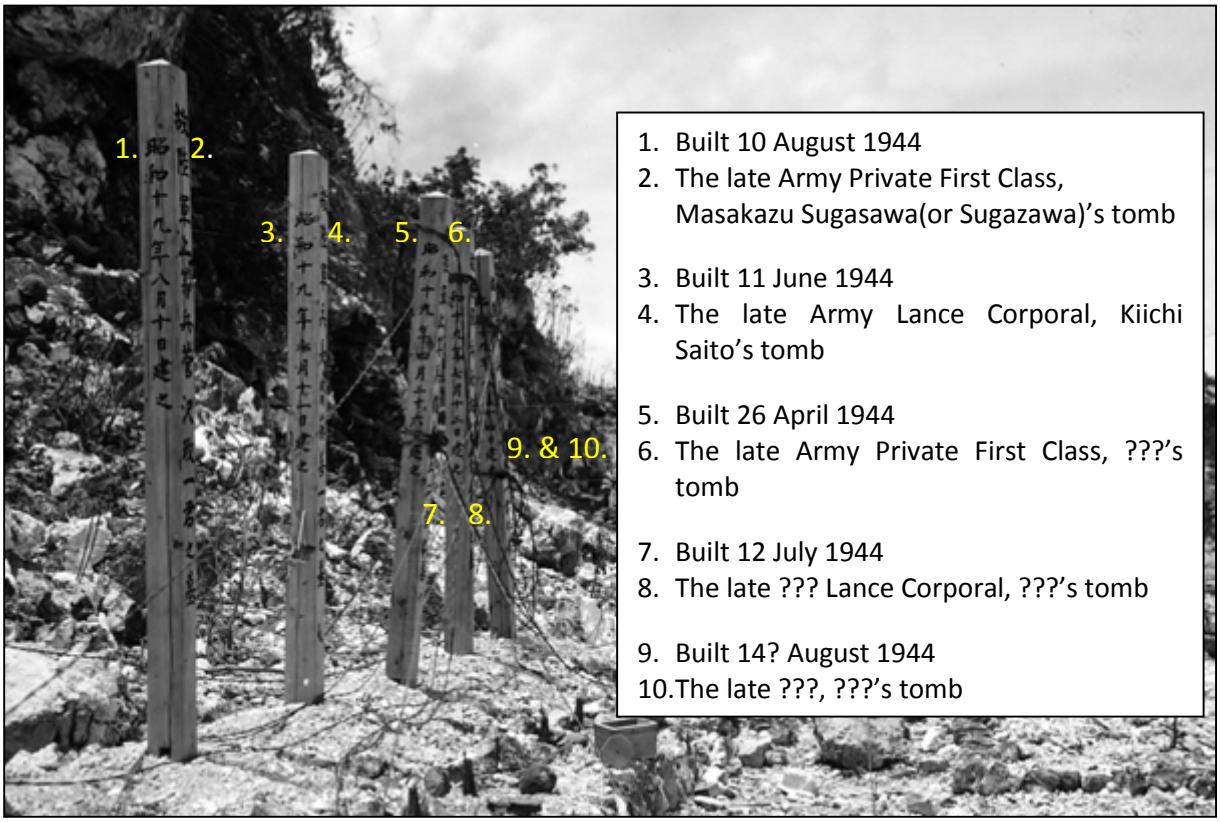


Figure 92 - AB14-113: grave marker inscriptions (translated & compiled by Tomomi Takemoto)

3.0.5 The 321st Infantry Trail & Hill B

PAS'14 Site #	Site Description
AB14-091	US Defensive Fighting Position - c-shaped fire trench
AB14-092A	US Defensive Fighting Position - possible Company (60mm) mortar emplacement
AB14-092B	US Defensive Fighting Position - roughly rectangular coral skirmisher trench
AB14-092C	US Defensive Fighting Position - x2 coral skirmisher trenches
AB14-092D	US Defensive Fighting Position - rectangular coral skirmisher trench
AB14-092E	US Defensive Fighting Position - oval coral skirmisher trench
AB14-092F	US Defensive Fighting Position - oval coral skirmisher trench
AB14-092G	US Defensive Fighting Position - circular coral skirmisher trench
AB14-092H	US Defensive Fighting Position - crescent coral skirmisher trench
AB14-092I	US Defensive Fighting Position - x3 coral skirmisher trenches
AB14-092J	US Defensive Fighting Position - rectangular coral skirmisher trench
AB14-092K	US Defensive Fighting Position - crescent coral skirmisher trench
AB14-092L	US Defensive Fighting Position - L-shaped coral skirmisher trench
AB14-092M	US Defensive Fighting Position - c-shaped coral skirmisher trench
AB14-092N	US Defensive Fighting Position - rectangular coral skirmisher trench
AB14-092O	US Defensive Fighting Position - L-shaped coral skirmisher trench
AB14-092P	US Defensive Fighting Position - circular coral skirmisher trench
AB14-092Q	US Defensive Fighting Position - rectangular coral skirmisher trench
AB14-092R	US Defensive Fighting Position - oval coral skirmisher trench
AB14-093	Natural Cave - not accessed due to ERW threat
AB14-094	Natural Cave - vertical entrance, multi-level chambers
AB14-095	Natural Cave Rock Shelter - improvised fighting position
AB14-096	Defensive Fighting Position - crescent coral skirmisher trench
AB14-097	Defensive Fighting Position - crescent coral skirmisher trench
AB14-098	Defensive Fighting Position - crescent coral skirmisher trench
AB14-099	Defensive Fighting Position - square rock-cut possible mortar emplacement
AB14-100	Natural Cave - personnel shelter
AB14-101	Natural Cave Rock Shelter - 14th Division Tank Unit maintenance dispersal
AB14-102	Natural Cave Rock Shelter - 14th Division Tank Unit ammunition dump
AB14-103	Defensive Fighting Position - square rock-cut rifle pit
AB14-104	Artificial Cave (Army U- type)

Artifact Site / Small Find #	Artifact Description
AB14-SF067	US M1A1 'Thompson' Sub-machine Gun Magazine - fully loaded
AB14-SF068	US Ordnance - x2 Mk2 Hand Grenades
AB14-SF069	US Ordnance - US M15 WP smoke grenade
AB14-SF070	Ordnance - IJ Type 99 Hand Grenade & US M1 Carbine magazine
AB14-SF071	US Ordnance - x3 Mk2 Hand Grenades & US Bayonet
AB14-SF072	US Ordnance - 2.36inch M6A5 HE AT Rocket Projectile
AB14-SF073	Material Assemblage - US Small Arms Ammunition & Canteen
AB14-SF074	US Food Ration Can - unopened
AB14-SF075	US Ordnance - x2 Mk2 Hand Grenades
AB14-SF076	US Ordnance - US M15 WP smoke grenade
AB14-SF077	US Naval Ordnance - 5inch Mk35 Projectile & US Canteen Cup
AB14-SF078	US Naval Ordnance - 5inch Mk35 Projectile
AB14-SF079	US Jerry Can
AB14-SF080	US .30 cal Ammunition Box Lid
AB14-SF081	US Jerry Can
AB14-SF082	US Jerry Can
AB14-SF083	US Jerry Can
AB14-SF084	US Jerry Can
AB14-SF085	US M1918A1/2 BAR Magazine & US Army M3 Respirator Face Mask

The discovery and subsequent seizure of a narrow, undeveloped jungle track just north of the CCZ which crossed the mountainous central spine of Peleliu from the west coast to the east coast is widely regarded as one of the most significant breakthroughs for the invading US forces in the battle of Peleliu (Blair and DeCioccio 2014: 140, Garand and Strowbridge 1971: 201, Gayle 1996: 36, Hallas 1994: 185, Hough 1950: 116 and WDHC 1948: 142). Named after the men who secured it, the 321st Infantry Trail enabled the core area of Imperial Japanese opposition in the southern Omleblochel Mountains to be surrounded, isolated and gradually reduced through attacks from the more weakly defended north. The western entrance to the trail was first spotted on 24th September (D+9) as the 2nd and 3rd Bn's of the 321st Regimental Combat Team (RCT), 81st Infantry Division and 3rd Bn, 7th Marine Regt advanced up West Road. Other trails had been found leading east into the Omleblochel from West Road but these had all ended abruptly in impassable topographic features (Blair and DeCioccio 2014: 127).

Finding the 321st Infantry Trail today is much more of a challenge than it was in 1944 with the entirety of the low lying eastern end having been subjected to immediate and more recent post-war landscaping with contemporary and historical maps depicting bivouac areas and new roads across the area. Inaccurate maps, limited previous exploration and lack of local knowledge of the area all contributed to the challenge, and resulted in the UoA team

mistaking an overgrown post-battle track for the 321st Infantry Trail and entering the jungle from the main, modern west road approximately 300m too far south. This track was followed for c.100m as it headed south-east but when it began to turn sharply north suspicions were alerted that it may not be the Trail and it was decided to break from the track and head roughly east in the hope of coming across the actual Trail. Post-fieldwork analysis of historical maps has since revealed that the initial route followed by the UoA team was an overgrown road constructed by the US military after the battle (see Appendix 8).

AB14-091 US Defensive Fighting Position

Just after leaving the post-battle track, a slightly curving c-shaped trench was located cut into the coral rock. This was 4m long, 0.87m wide, 0.25m deep and aligned north-north-east to south-south-west. A single metal post was found in the south-west end. With a lack of characteristic material culture and the distance away from the 321st Infantry Trail, it is unclear whether the site is a US or IJ position or whether, in fact, it dates to the battle period or later activity connected with the construction of the track. Located on the general eastern line of advance, the trench is most likely the shallow remains of a US Army fire or slit trench.

Control of the 321st Infantry Trail

It was *Easy* Company, 2nd Bn, 321st RCT under the command of Captain Lloyd Deerinwater that led the initial incursion to the east along 400m of gently winding track through swampy flat ground before hitting the first ridge (WDHC 1948: 141 & Hough 1950: 113). *Easy* Company topped this 40ft ridge relatively easily and unopposed, however, once over the crest, Deerinwater's men came under heavy fire from a steep sided, 100ft hill that formed the northernmost tip of the Omleblochel range and which dominated the remainder of the route east. Recognizing the hill as a significant landmark critical to controlling the west-east artery that was the 321st Infantry Trail, *Easy* Company assaulted the precipitous slopes directly. An intense battle ensued as Deerinwater's men improvised ladders, climbed and crawled up the slopes whilst exchanging grenades with the defenders above them (Blair and DeCioccio 2014: 131). By nightfall *Easy* Company had wrestled the summit from its defenders and immediately began preparing defensive fighting positions in anticipation of a counterattack. Deerinwater was awarded a Silver Star for his leadership and gallantry on the 24th and his award citation paints a vivid picture of the conditions on what became known as the US Army's Hill 100 as the IJ sought to unseat *Easy* from the hill top:

"After leading his Company in a successful assault, Captain Deerinwater was supervising the construction of defensive positions when two of his men were wounded by fierce enemy counterattack. Unhesitatingly, he went to the wounded men who were lying exposed to heavy automatic and grenade fire, and with complete disregard for his own safety carried the more seriously wounded of the two to a place of safety. Although during this action he was wounded by an enemy grenade, he exposed himself again to evacuate the remaining casualty. Captain Deerinwater's conduct so inspired his men that they immediately reoccupied the position and killed or dispersed the attacking enemy force." (USAHEC 1946c: Vol.1 Pt.J: 8-9).

Although very much in the vanguard, *Easy* Company was not on its own. To the immediate north, F *(Fox)* Company, 2nd Bn, 321st RCT also moved east protecting *Easy's* left flank and to the immediate south Colonel Dark, Commander of the 321st RCT, ordered the lead three Companies of 3rd Bn, 321st RCT to wheel east and tie in with *Easy* (Garand and Strowbridge 1971: 199). This maneuver formed a line of advance that extended from *Fox* Company, 2nd Bn in the north to K *(King)* Company, 3rd Bn in the south (WDHC 1948: 142). Armored support was lacking; however, as the Trail was found to be impassable for tanks and *Easy* Company was digging in on top of Hill 100 before the armored bulldozers of *Able* Company, 306th Engineer (Combat) Bn were setting to work widening the track (Hough 1950: 114).

Hill 100 is connected to the rest of the Omleblochel range by a flat topped escarpment to the immediate south. This escarpment was key to protecting the strategically important Hill 100 from counterattack from its most vulnerable and shallowest inclined southern approaches. The escarpment also marked the beginning of a long, broad ridge top which ran south, deep into the Omleblochel offering enormous strategic opportunity as a future line of advance at height into the CCZ. As *Easy* Company was gaining the top of Hill 100, *Item* Company, 3rd Bn, 321st RCT approached the base of the 100ft high escarpment to the immediate south. With supporting fire from *Easy*, the men of *Item* scaled the steep western slopes using alpine assault techniques (Figure 93) where they too began to construct defenses in preparation for the counterattack which soon followed (WDHC 1948: 142).

Figure 93 - Wildcats using 'alpine' tactics to gain a precipitous summit on Peleliu

AB14-092 (A-R) US Defensive Fighting Positions

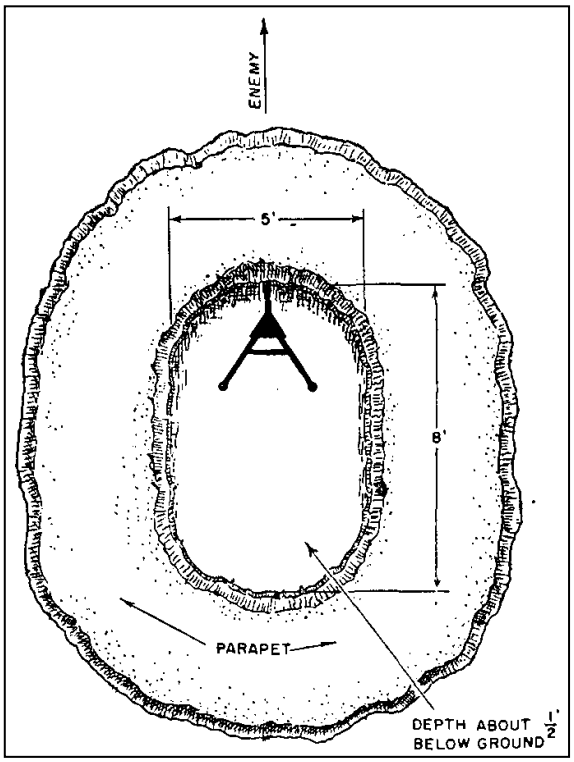
An incredible system of twenty mutually supporting defensive fighting positions identified forming a perimeter around a mostly flat plateau at 100ft (30.48m) elevation (Figure 96). A large quantity of US military equipment and ordnance was recorded within and between the positions as well as spread more broadly across the plateau. Undetonated examples of IJ ordnance were in the minority and, where present, were located on the south-east slope below US positions. Initially the GPS height and location as well as the concentration of US artifactual material suggested that this complex of sites was the *Easy* Company positions on the summit of Hill 100. However, following fieldwork, a comparison of the site coordinates with more detailed contour mapping (Appendix 8) in a Geographic Information System (GIS) revealed that the site area was located 100m south-west of Hill 100 and formed the northernmost part of the escarpment captured by *Item* Company, 3rd Bn, 321st RCT on 24th September.

Item Company would have comprised Company headquarters, three rifle platoons and a weapons platoon (War Dept. 1944b: 1). A US Army rifle platoon at full strength consisted of 39 men which broke down further into three rifle squads of 12 men and a platoon command group (Moran and Rottman 2002: 35). All of the defensive fighting positions identified on the South 100 Escarpment are large enough to accommodate two men which resembles the basic type of infantry entrenchment most commonly referred to as a two-man foxhole. These

larger positions were favored over one-man foxholes for the psychological benefits afforded by the close proximity of a comrade and the tactical benefits of a position continuing to operate if one man became a casualty (Rottman 2005: 32). Many of the decorations awarded on Peleliu (often posthumously) for acts of gallantry testify to the bonds formed between men sharing the same defensive fighting position. Silver Star recipient Private First Class Joseph Broffman, *Easy* Company, 2nd Bn, 321st RCT was one such individual who lost both his legs whilst using his own body to shield two comrades from the blast of a grenade that landed in their foxhole on 26th September (USAHEC 1946c: Vol.1, Pt.J: 9). Staff Sergeant William Sherry was another recipient who sacrificed his own life doing the same on the 1st October (*ibid.:* 11).

As discussed in Section 3.0.2, the G.I.'s encountered the same difficulties as the Marines when it came to 'digging-in' and had to adapt the standard types directed in the field manual to suit the thin soil over hard coral rock that they found themselves fighting over. The defensive fighting positions on the South 100 Escarpment reflect this field-improvisation well with two standard entrenchment forms being combined and adapted slightly to produce satisfactory concealment and protection. Most of the positions initially resemble the skirmisher trench type with curving coral rock parapets (c.0.50m height) constructed to the front and sometimes sides of roughly rectangular, shallow depressions. However, in many cases the overall dimensions of the positions (c.2x3m) are twice that of a standard skirmisher trench with parapets extending around the full circumference in a rounded-rectangular or oval plan form. The dimensions and form of these positions fits most closely with the initial stage of the horseshoe-type light machine gun (LMG) emplacement which were scaled to allow for the two-man crew, the weapon and ammunition (Figure 94). In five cases (B, D, F, G, N & R) fragments of corrugated iron sheeting were found in the positions suggesting a further modification of the design to incorporate a degree of concealment, shade and overhead protection from falling shrapnel. Examples of this have been noted on historic photographs depicting US Army personnel 'dug-in' on Radar Hill (see Section 3.2, Figure 195). It is clear from the surviving examples on the South 100 Escarpment that *Item* Company was amalgamating multiple standard 'hasty fortification' types to create positions large enough to accommodate more than one man, offer all-round protection and could be used by riflemen and automatic weapons teams.

The size, number and relative positioning of the skirmisher trenches on the plateau suggests that this site served as a platoon sized defense area for one of the three platoons of *Item* Company. The layout conforms to the infantry field manual guidelines for a platoon defense area (Figure 95) with the defensive fighting positions located to offer all-round protection covering the flanks and rear as well as the front (War Dept. 1944b: 246) with support from LMG's and mortars from the Company weapon platoon.



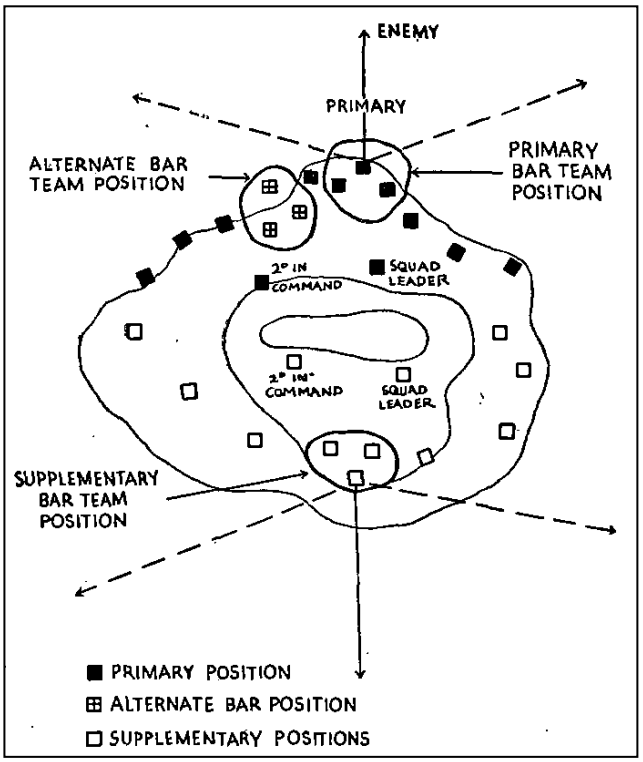


Figure 94 - Early phase LMG emplacement (*ibid.*: 251) and **Figure 95** - Infantry defense area schematic (*ibid.*: 247)

Although not the strategically important and historically well documented Hill 100, the South 100 Escarpment provides a truly unique insight into a remarkably well preserved and near complete US Army infantry platoon defense area. The temporary field fortifications and their associated material assemblages tell a vivid story of the action that took place here on the 24th-25th September 1944 and, as such, represent one of the best preserved and therefore highly important areas of the Peleliu battlefield worthy of further investigation and long term preservation.

AB14-092A is a large, roughly rectangular position (4.77x3.83x1.30m [LxWxD]) constructed in a natural hollow on the south-west tip of the plateau with a coral rubble parapet on the southern downslope side and steep drops to the east and west (Figure 96). A small, 1m square foxhole was noted immediately to the north-west which appears to have been

created from a naturally occurring crevice in the rock. The combination of the two features suggests that this position may have served as an emplacement for one of *Item* Company's 60mm mortar squads. When attached to rifle platoons, mortar squads were positioned in defiles within visual signaling distance of an observer and sited to defend the most vulnerable approaches to the platoon area (*ibid.*: 156). Site 092A is well located to cover the easiest topographic approach to the platoon area, a narrow ridge running south connecting the plateau to the rest of the Omleblochel. The small foxhole may have served as the observer's position.

AB14-SF067-076

Although intended for the jungle floor artifact survey in The Horseshoe/Mortimer Valley, the small finds numbering and recording system was redeployed upon arrival at the South 100 Escarpment site owing to the density, lack of disturbance and quality of preservation of artifacts spread across the area. Ten individual concentrations were recorded: nine of which included explosive remnants of war, the context of which would later be lost with their removal for disposal by CGD. Other artifacts, not recorded individually, are included in the table on the next page. In the majority of cases, the artifacts assisted in telling the story of the fighting and preparation for battle that took place in the platoon defense area. Ration cans lay in discarded heaps where they'd been consumed and then tossed out of positions; one can lay unopened next to skirmisher trench 092L. Small arms ammunition and hand grenades were stashed in niches in the rubble parapets or carefully placed close at hand within easy reach (Figure 97).

"*I developed a favorite sleep position: left side, left arm around neck, knees pulled up near fetal position, right hand on trench knife (later on pistol) which was next to a few hand grenades, everything ready for action"* Lieutenant George Rasula, G (*George*) Company, 2nd Bn, 321st RCT (Blair and DeCioccio 2014: 169).

Single, unfired .30 cal projectiles were found: sometimes carefully placed in a recess, sometimes lying where they had fallen as a rifle was cleared to render it safe or to free a stoppage in the heat of a fire fight (War Dept. 1942: 34-35). An undetonated IJ Type 99 hand grenade (SF070) lay on the slope beneath 092K where it had rolled after falling short of the coral parapet. Next to it lay a full US M1 Carbine magazine, perhaps lost over the edge of the

parapet by a squad leader or crew-served weapon member as they fumbled to reload, fire at and suppress the attacker who threw the grenade. Perhaps the most poignant amongst the artifact groups was an assemblage of US .30 cal M1 Garand rifle clips and a US water canteen lying as they would if they had been attached to a discarded rifleman's belt. The canteen exhibited the unmistakable indent left by a sabre blade where it had made contact during a close quarters skirmish.

Artifacts Noted (by site #):
B: US jerry can **D:** US communication cable • full US M1A1 'Thompson' magazine and full US M1 Garand .30 cal clip (near D) **F:** US Mk2 hand grenade • empty M1A1 'Thompson' magazine in niche **H:** US ration cans • US communication cable drum **I (near):** large caliber shrapnel fragments • projectile fuse • cache of US M1 Garand .30 cal clips • US water canteen with sabre cut • US ration can base **J (near to):** x2 undetonated US Mk2 hand grenades • undetonated US M15 White Phosphorous (WP) smoke grenade **K (down slope from):** undetonated IJ Type 99 hand grenade • full US M1 carbine magazine **L:** unopened US ration can • x3 undetonated US Mk2 hand grenades • US bayonet • unfired US .30 cal projectiles **M (near to):** x2 undetonated US Mk2 hand grenades • undetonated US 2.36" rocket projectile **O:** US ration can cache **R (near to):** undetonated US M15 WP smoke grenade **Q:** large caliber shrapnel fragments • combat boot fragments • US entrenching shovel blade

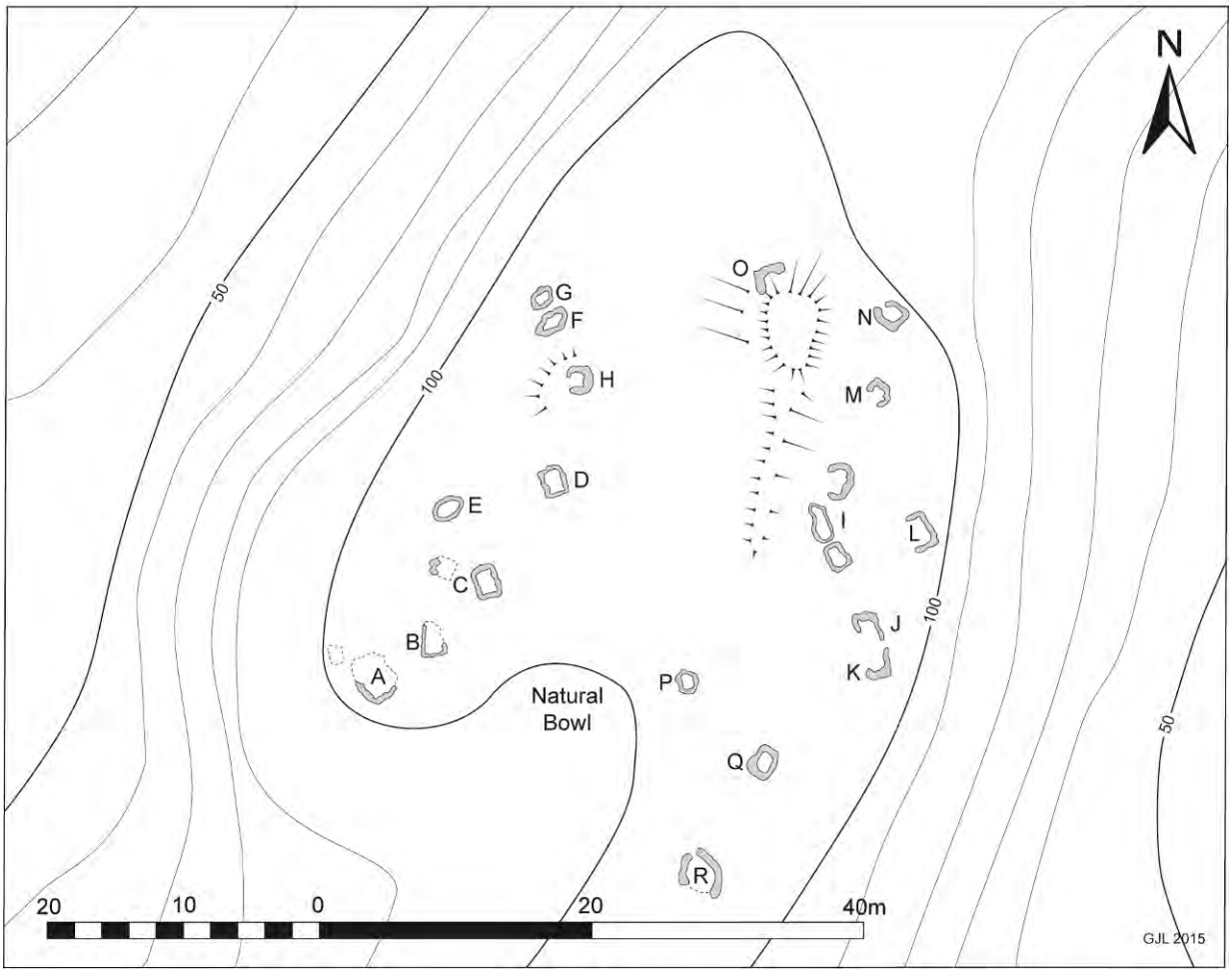


Figure 96 - AB14-092: sketch plan showing relative location & form of defensive fighting positions

AB14-092F

AB14-SF073

AB14-092I

AB14-SF071

AB14-SF071

AB14-SF067

Figure 97 - AB14-092: skirmisher trenches & artifact assemblages

AB14-093 Natural Cave

This is the first of two caves that were located in the base of a natural bowl on the south-west side of the South 100 Escarpment. This example has a very small triangular entrance facing east (0.74x0.56m [HxW]) and slopes down very steeply through a sharp coral passage. The preliminary safety inspection conducted by Ballinger concluded that caving equipment would be required for further access and movement within the cave, and that large quantities of unexploded ordnance were present. As appropriate measures could not be put in place at the time to mitigate the risks, no members of the UoA team entered the cave and no further survey took place.

AB14-094 Natural Cave

The second cave in the natural bowl on the south-west side of the South 100 Escarpment facing west-south-west. Similarly to AB14-093, this cave has a small, irregularly shaped entrance (1.07x073m [HxW]) which opens into a very steep, near vertical passage. The passage descends 2.65m to the first of two levels with uneven, natural walls, ceiling and floor. This small upper chamber (2.40x1.20x1m [LxWxH]) is roughly circular with multiple layers of rockfall debris spread across the floor area. An empty US jerry can is the only artifact visible on this level. A narrow slot (1.60x0.90m [LxW]) in the north-east corner of the floor drops down a further 2.35m into the lower chamber which is larger (2.40x1.20x1m [LxWxH]) and equally natural in form with stalactites extending upwards from the uneven floor. A brass IJN officer's tunic button (Figure 98) was the sole artifact located on this level. The presence of this item would suggest the use of this natural, water-formed cave as a shelter by IJ personnel. These caves, set into the sides of the South 100 Escarpment, likely served as improvised protection for the defenders of this area that were encountered by *Item* Company on 24th September as they advanced east.

Figure 98 - AB14-094: upper chamber from cave opening and IJN officer's brass tunic button

AB14-095 Natural Cave Rock Shelter

A semi-circular recess in the western side of the natural bowl on the south-west side of the South 100 Escarpment appears similar to the improvised fighting positions encountered in The Horseshoe/Mortimer Valley. For this reason it was recorded as a possible IJ defensive position although no artifacts or evidence of combat were observed. The recess measures 1m high by 0.5m wide and faces east.

The Capture of Hill B

As dawn broke on the 25th September (D+10), *Able* Company's (306th Engineer Bn) armored bulldozers had widened the 321st Infantry Trail sufficiently for light vehicles to reach *Easy* (2nd Bn) and *Item* (3rd Bn) Company with provisions and to evacuate their wounded (WDHC 1948: 142). With their supply line more securely established and the gains on Hill 100 and the South 100 Escarpment holding, the 321st RCT continued their drive east with the objective of securing the remainder of the Trail and reaching East Road, a major conduit connecting the IJ forces in the CCZ with those in the north of Peleliu. Dominating the east end of the Trail and the East Road was the independent, 200ft high mass of Hill B (*Naka Hill*). Although only 150m west of Hill 100, and clearly visible from the South 100 Escarpment, it took *Easy* Company 3.5 hours to reach the base of Hill B where it faced a crossing over the open ground of East Road under intense automatic, rifle and mortar fire which reigned down from the concealed IJ positions on the steep sided hill (Blair and DeCioccio 2014: 134). Support from *Item* Company failed to materialize as further movement east across the ridge top was met by heavy fire that pinned the Company down for the remainder of the day (*ibid.*).

It took a further two separate assault attempts including a three pronged maneuver involving a smoke screen that enveloped the whole hill and an armored task force that had practically circumnavigated the island cutting through Japanese held territory along the way before Hill B was finally captured at 16:47 on the 26th September (Blair and DeCioccio 2014: 134-140, Committee14 1950: 68-72, USAHEC 1946c: Vol.2, Ch.2: 6-7 & WDHC 1948: 145-147). Taking and holding Hill B marked the first major operational success of the 81st Infantry Division on Peleliu (Blair and DeCioccio 2014: 140) as it completed the encirclement of the Imperial Japanese's fiercest area of resistance in the central and southern Omleblochel Mountains.

AB14-096 Defensive Fighting Position

Once above the 100ft contour on Hill B, the terrain begins to open out from the near vertical sides that form the lower slopes into a series of natural, stepped terraces. The small, more level platforms that exist between the steps offer the only suitable terrain for the construction of structures and it is on these platforms at the north and south ends of the long, narrow crest that defensive fighting positions were identified.

This broad, roughly rectangular position (3.46x2.5m) is the most northerly, situated on the north edge of a terrace with a 0.30m high coral rock parapet erected on three sides of it forming a flattened crescent shape in plan. The site has excellent views through 180° from west to east but predominantly faces north-north-east. No artifactual material was found in association with this site making it difficult to ascertain whether this was originally a position constructed by the IJ defenders or the US Army following the capture of the hill. The form most closely resembles the examples encountered along Walt/Pope Ridge as opposed to those noted on the South 100 Escarpment.

AB14-097 Defensive Fighting Position

The smaller of two crescent shaped positions located at the north end of the Hill B crest consists of a coral rock parapet four courses high (0.50m), 3m wide and 1.50m in depth (Figure 99). This position is east facing with a view out over the mangrove swamp to the east of Hill B. Similarly to AB14-096, there is no associated material evidence at this site making characterization difficult. Hough's account of the seizing of Hill B describes how *Easy* and *Fox* Companies, 2nd Bn, 321st RCT gained the summit against a highly resolute defense and "*set about the dirty job of making it tenable*" (Hough 1950: 116). This phrasing could be interpreted as meaning that defensive fighting positions were constructed along the summit of the hill and as such may indicate that the positions recorded as sites 096-99 are US Army skirmisher trenches.

AB14-098 Defensive Fighting Position

This roughly circular position (c.1.80m diameter) is located nearer the southern end of the Hill B crest and is almost situated on the highest point. It has extensive views in all directions but is predominantly orientated towards the south where the crescent-shaped coral rock parapet is at its most extensive. The remains of two timber poles extend upwards from the

center and may relate to communications activity. Three ephemeral features that could potentially be crescent-shaped defensive fighting positions are situated on the east, west and south edges of the terrace to the immediate south of this site, however, they were not considered substantial enough to record.

Figure 99 - AB14-097: Hill B defensive fighting position

AB14-099 Defensive Fighting Position

A square, roughly vertical-sided, flat-based pit has been dug into the most southerly flat area of the upper terrace on the central crest of Hill B. It measures 2.8m^2 and is 0.85m in depth. Clear visibility is achievable in all directions with a particularly good field of fire to the south. No material evidence was present at this site making characterization difficult. The form is similar to a US open-type mortar emplacement with dimensions large enough to accommodate either a 60 or an 81mm mortar and crew (War Dept. 1944a : 65-68). However, the construction method of excavating so deeply through the hard coral rock does not conform to the 'hasty' nature of other US field fortifications encountered on Peleliu. It therefore remains unclear whether this was a US or IJ position and could have served either side or indeed both as a mortar emplacement at different stages in the battle.

AB14-100 Natural Cave

Three natural caves were located along the southern base of Hill B. The first and central example has a low, wide, south facing entrance (1.33x2.95m [HxW]) which has what appears

to be a low, loosely heaped coralline limestone rubble wall running across its mouth. The rubble appears to have been loosened and partially collapsed through an explosive detonation event. The cave is roughly 'I-shaped' with a single longitudinal north-south chamber (7.14m deep) which has a large opening in the ceiling approximately halfway along. Small fragments of a small metal can were visible at the entrance but otherwise no artifactual material was in evidence.

In addition to the strategic importance, the capture of Hill B is also noteworthy as the location for the largest number of prisoners to be taken in one day by US forces. 86 prisoners which included 20 Koreans were captured between the 26th and 27th September on and around Hill B (USAHEC 1946c: Vol.2, Ch.2: 7 & Hough 1950: 116). This represents 43% of the total number of 202 prisoners of war (POWs) captured on Peleliu during the battle (Moran and Rottman 2002: 89). Many of the POWs were non-combatant laborers from the Kobayashi unit of the IJ Naval Construction Force who had been sheltering in caves on Hill B (see NARA: 127-307-C1-3). Takajiro Kumaki was a vehicle mechanic in the Kobayashi Force who surrendered with burns to his skin when white phosphorous (WP) smoke grenades were thrown into his cave shelter (NARA 27/09/1944). Takajiro reported to have been hiding in this particular cave, unarmed and with no ammunition for a week with other men who were either burned or wounded when their shelter was attacked (*ibid.*). With the lack of military offensive material at AB14-100, this site is the kind of natural cave that Takajiro may have sheltered in and eventually surrendered from.

Takajiro is one of very few Japanese personnel to have survived a cave attack on Peleliu and was especially fortunate to have escaped an attack that used WP. As well as creating an impenetrable white plume, the smoke emitted from US M15 WP smoke grenades was rich in phosphorus pentoxide which could cause injury and death through inhalation and direct contact. Its prevalent use on Peleliu, in contained spaces for cave clearance and in the open for masking troop movements, could well account for the high frequency of IJ respirators (gas masks) identified in cave assemblages during both the 2010 and 2014 surveys. Undoubtedly IJ personnel would have endeavored to protect their eyes and respiratory systems from the burning chemical irritant in the smoke and may well have spent much of their time fighting and sheltering in their gas masks which would have made the already stiflingly hot and humid conditions even more uncomfortable.

AB14-101 Natural Cave Rock Shelter

A small, natural cave rock shelter forms part of what appears to be a larger complex of features at the base of Hill B. Facing south-west, the cave is 1.14m wide, 1.50m high and 2.21m deep with undulating walls and coralline limestone rubble across the floor area. The cave is set into the north-east side of a roughly circular basin which has been roughly levelled. The basin measures 3.90x5.50m with a broad opening to the west. A small, open topped niche (1.29x0.88m) is located on the south-west site of the basin towards the rear, almost opposite the rock shelter. No artifacts were observed in the site area (Figure 100).

The interrogation report for Superior Private Takeo Sugimura offers some of the most detailed information from a Japanese source relating to the 14th Division Tank Unit and its disposition, confirming the number of tanks (17) operating on Peleliu as well as the organizational structure of the unit (x4 Type 95 Ha-Go light tanks in three platoons, x4 in the HQ platoon and x1 attached to the maintenance unit) (USAHEC 16/10/1944). Critically, Takeo also provides the tactical grid co-ordinates for the Tank Unit's base of operations on Peleliu which was located at the foot of the southern slope of Hill B (*ibid.*). US historical accounts and artifactual evidence from AB14-102 (see site description) support Takeo's testimony confirming that the southern Hill B area served as a depot for the 14th Division Tank Unit. With AB14-102 serving as the ammo dump for the depot, it is highly likely that given their caves AB14-100 and 101 also formed part of it. The open basin at the mouth of AB14-101 could act as a hard standing for a tank undergoing repairs by the maintenance unit (*ibid.*) with the cave and niche storing spare parts and equipment. The contextual association to the 14th Division Tank Unit makes these dispersed sites of particular historical importance; they significantly contribute to the story of the battle providing the origin for the IJ counterattack that failed to break the US beachhead on D-Day.

Figure 100 - AB14-101: general view of site area showing natural basin, niche & cave

AB14-102 Natural Cave Rock Shelter

This site is the third natural cave identified during the survey along the southern base of Hill B. It is the most westerly and therefore closest to the road with a high, broad entrance mouth facing south-south-west. Like many of the natural rock shelters encountered on Peleliu during the survey, the site consists of a long, shallow, rectangular depression in the rock face (3.47x2.29x1.62m [WxHxD]) with uneven, unimproved walls and ceiling. An area of collapse is evident at the south-west side of the cave opening where an overgrown heap of coralline-limestone rubble extends out 1.20m from the rock face.

By far the most significant component to this site is the vast quantity of ERW that was identified by the CGD team. A total of two hundred and seventy IJ 37mm HE projectiles, thirty seven IJ 37mm AP projectiles, fourteen US 30lb demolitions charges and one US M15 WP smoke grenade were recovered from the rock shelter. Only four of the demolitions charges were found within the cave itself with two located just outside and the rest 5.31m downslope. The majority of the 37mm projectiles were covered by a sandy deposit that spread across the north-western part of the cave floor and were excavated by a separate team of CGD experts who were called out following the discovery of the large cache of unexploded ordnance. The high sand content in a relatively contained area may be indicative of the presence of sandbags being used. Most of the projectiles were carefully stacked in the north-west corner of the rock shelter where several lengths of timber were also found. The timber had 37mm diameter, semi-circular indents at regular intervals along its length suggesting that it was part of a wooden storage crate for the ordnance (Figure 101).

Figure 101 - AB14-102: buried 37mm projectiles (top right) with storage crate fragments (foreground)

Given the quantity and in situ nature of the 37mm projectiles (Figure 102), it is likely that this rock shelter served as a small ammunition store for the IJA. This interpretation can be corroborated by historical accounts, most notably that of the 710th Tank Battalion, where Task Force Neal (named after its commanding officer, Captain Neal) is reported to have encountered a small ammunition dump whilst moving south along East Road on a patrol from its bivouac area north of Hill B on 27th September (Committee14 1950: 73). The same source also describes the activities of a US demolitions squad that was working in the Hill B area sealing caves with demolitions charges (*ibid.*: 72) and it is possible that the IJA ammo dump was also used as a temporary store for the US demolitions unit following its capture.

Figure 102 - AB14-102: excavated 37mm projectiles and 30lb demolitions charges

The discovery of so many 37mm projectiles at the base of Hill B would also appear to confirm the use of this area by the IJA's 14th Division Tank Company. The principal armament of the Type 95 Ha-Go light tank that the unit was equipped with was the 37mm which was known to fire both HE and AP projectiles (War Dept. 1944c: 245). A large stock of these projectiles is likely to have been kept in the tank unit depot area and it is perhaps unsurprising that a higher quantity of HE projectiles were found as the majority of the AP ordnance would have been loaded onto the tanks in anticipation of encountering US armor during their counterattack on 15th September. Although none was seen during the survey, *Able* Company, 710th Tank Bn also record passing piles of vehicle radio equipment and a substantial supply cave during their drive south past Hill B (Committee14 1950: 73-74) adding further evidence to this area containing a series of dispersed supply and support facilities for the tanks of the 14th Division.

AB14-103 Defensive Fighting Position

A square pit (1.35x2.12x0.74m [WxLxD]) with vertical sides and a flat base excavated into the coral bedrock at the foot of Hill B. A US jerry can was observed in the base of the pit and a loaded US .30 cal M1918A1/2 Browning Automatic Rifle (BAR) magazine and US Army M3-type service respirator (gas mask) (Figure 103) were found in very close proximity (AB14-SF085). Despite the close proximity of US military material culture to this site, the substantial construction effort of excavating a pit of this nature through the hard coral bedrock does not conform to the 'hasty' nature of US field fortifications encountered elsewhere on Peleliu: historical accounts also describe how it was not possible for the men of the 321st RCT to 'dig in' along East Road due to the hard, rocky ground (Hough 1950: 130). These explanations combined make it unlikely that this site was constructed by US personnel. It is far more likely that this pit formed the lower portion of a covered IJ rifle pit or a coconut log pillbox offering protection for a single rifleman. Examples of these types of camouflaged defensive fighting position noted in US post-battle assessments on Peleliu (NARA: 127-306-C1-2) and in Imperial Japanese field fortification manuals (USAHEC 1943: 7) match the approximate form and dimensions of this pit. The presence of so much US material culture can be attributed both to the intense fighting that took place during the assault on Hill B and the bivouacking of *Fox* Company, 2nd Bn, 321st RCT around the base of the hill overnight on 27th September (Hough 1950: 130 & WDHC 1948: 148).

Figure 103 - AB14-SF085: US M3-type service respirator face mask & M1918 A1/2 BAR magazine

AB14-SF079-85

A spread of five US Jerry Cans, the lid of a .30 cal metal ammunition box, a loaded US .30 cal M1918A1/2 Browning Automatic Rifle (BAR) magazine and the partial remains of a US Army M3-type service respirator (gas mask) were identified across the lower south-western slope of Hill B near East Road. The Jerry Cans were in varying states of decay with none exhibiting signs of destruction through explosion of the contents. One of the many techniques employed by US Forces for clearing caves involved pouring petroleum in through the entrance and then igniting it: "*I had a little book that would translate English to Japanese, and I would holler out the best I could, 'Come out with your hands up.' Of course, nobody ever came out. We would pour gas in there and light it up, and we would hear people screaming, but nobody ever came out."* (Clifton Dantin in Blair and DeCioccio 2014: 196). It is likely that the spread of Jerry Cans is associated with the systematic clearance of caves on Hill B using this kind of technique. The M3-type gas mask and BAR magazine (Figure 103) also likely date from the assault on Hill B and activity related to cave clearance. Historical photographs consulted at NARA depict US personnel wearing gas masks whilst operating M1 and M9 'bazooka' rocket launchers which was presumably a protective measure against the fine coral dust created when using the weapon on caves at close quarters (Figure 104).

Figure 104 - Gas mask wearing bazooka operator clearing a cave on Peleliu

AB14-104 Artificial Cave - Army U-Type

At 0700 hours on 27th September (D+12) the 2nd Bn, 321st RCT began the process of reducing the central pocket of resistance by moving south from Hill B; *King* Company advanced along the ridge west of East Road, known as Unnamed Ridge, in line with *Fox* Company which

headed down East Road with the tanks of Task Force Neal (WDHC 1948: 147). Both Companies immediately began to draw heavy fire from concealed hostile positions. On East Road, *Fox* Company received fire from caves that were dug into the wall of the ridge and responded with a combination of direct fire from the Sherman tanks using WP rounds, an LVT flamethrower and demolitions squads equipped with satchel charges to systematically close them (*ibid.*: 148 & USAHEC 1946c: Vol.2, Ch.2: 10).

"*75-mm tank guns and flame throwers were used on one entrance while men with their individual arms and grenades covered the other entrance, and killed the Japanese as they ran out."* (Committee14 1950: 73)

Site AB14-104 is one such cave that was subjected to this treatment on the 27th September by *King* Company and the armor of Task Force Neal. Only the more southerly of the two entrances into this U-shaped cave was visible to the survey team from the exterior, the primary combat entrance being entirely sealed with collapsed coral rubble and debris (Figure 105). The secondary entrance faces east and is small (1x1.72m [HxW]) although this too has been partially closed by rubble collapse (originally 2.63m wide). The entrance is concealed from the road by an earth and rubble mound to its front which forms a high lip and a near vertical drop down of 0.73m to the beginning of the main entrance passage. The plan of the cave conforms to a standard U-type with short entrance passages leading into a curving main passage 7.04m long. A rough, partial niche has been excavated from the rear, west wall of the central passage which significantly widens what is otherwise a very narrow passage (only 0.92m wide without the niche). The general construction quality of the cave is very poor and appears hasty with uneven walls, ceiling and floor throughout which makes movement through the low main passage (1.05m high) very challenging. Decomposing leaf litter, prolific cave cricket (*Rhaphidophoridae*) excreta, accumulations of mold spores and poor air circulation also make atmospheric conditions in the cave very unpleasant.

Artifactual material, although evident, proved very difficult to identify owing to considerable destructive forces. Three concentrations of contorted, fragmented metal were observed towards the sealed combat entrance where a large fan of rubble debris almost fills what would have been the main entrance passage (Figure 105). Twisted fragments of what might be radio battery casing or grill mesh for a type of filter were discernible amidst the debris.

The only positive identification was the forward barrel, gas chamber and foresight of a 7.7mm Type 92 'Lewis-type' machine gun which protruded vertically from the rubble debris cascading from the combat entrance. The blackened residues from a flamethrower are evident across the walls and ceiling in the blocked entrance passage and extend to approximately halfway through the main passage.

Main passage looking south

Blocked combat entrance showing flame scarring

Unidentifiable twisted metal

7.7mm Type 92 machine gun barrel

Figure 105 - AB14-104: cave interior views

It is clear from the condition of the cave and material found that it was subjected to attack by flamethrower directed into the most northerly, therefore first encountered, entrance where a 'Lewis-type' machine gun was positioned. A significant detonation has then taken place inside the combat entrance destroying and disarticulating the metal objects located there. This may have been caused by an explosive charge being thrown into the cave or US 75mm tank projectiles being fired directly into it. Following this event the cave entrance has been sealed, most likely by the placing of a larger demolitions charge. No evidence was found during the survey to suggest what may have happened to the cave occupants, however, the presence of human remains being buried near the Type 92 machine gun underneath the collapsed debris cannot be ruled out.

3.1 Area B

3.1.1 Hill Row

PAS'14 Site #	Site Description
AB14-051	IJ Field Gun Emplacement - with 75mm Type 95 Field Gun
AB14-052	Artificial Cave (Army Y-type (a))
AB14-053	IJ Field Gun Emplacement - timber revetment casemate
AB14-054	Improved Natural Cave (balcony-type)
AB14-055	Improved Natural Cave (balcony-type)
AB14-056	Artificial Cave (Army U-type)
AB14-057	Natural Cave Rock Shelter - improvised fighting position
AB14-058	Artificial Cave (Army Y-type (b))
AB14-059	Destroyed Improved Natural Cave
AB14-060	Artificial Cave (I-type) - coral revetment at entrance
AB14-061	Improved Natural Cave Rock Shelter - improvised coral revetment fighting position
AB14-062A	US Defensive Fighting Position - rectangular coral LMG/HMG emplacement
AB14-062B	Possible Bomb Crater with possible US Defensive Fighting Position
AB14-062C	US Defensive Fighting Position - circular coral skirmisher trench
AB14-062D	US Defensive Fighting Position - circular coral skirmisher trench
AB14-062E	US Defensive Fighting Position - rectangular coral LMG/HMG emplacement
AB14-062F	US Defensive Fighting Position - square coral LMG/HMG emplacement
AB14-063	Artificial Cave (Army L-type) - revetment at entrance
AB14-064A	Improved Natural Cave - entrance
AB14-064B	IJ Defensive Fighting Position - improvised coral revetment fighting position
AB14-073	US Defensive Fighting Position - square coral skirmisher trench
AB14-074A	US Defensive Fighting Position - oval coral skirmisher trench
AB14-074B	US Defensive Fighting Position - oval coral skirmisher trench
AB14-075	Natural Cave Rock Shelter - improvised fighting position
AB14-076	IJ Defensive Strongpoint - cave and trench complex
AB14-077A	US Defensive Fighting Position - horseshoe LMG/HMG emplacement
AB14-077B	US Defensive Fighting Position - horseshoe LMG/HMG emplacement
AB14-077C	US Defensive Fighting Position - horseshoe LMG/HMG emplacement
AB14-077D	US Defensive Fighting Position - horseshoe LMG/HMG emplacement
AB14-077E	US Defensive Fighting Position - rectangular coral skirmisher trench
AB14-077F	US Defensive Fighting Position - L-shaped coral skirmisher trench

AB14-077G	US Defensive Fighting Position - horseshoe LMG/HMG emplacement
AB14-077H	US Defensive Fighting Position - possible CP
AB14-078	Improved Natural Cave (possible balcony-type) - blocked inner passage
AB14-086	IJ Improvised Defensive Fighting Position - fire trench
AB14-087	Natural Cave Rock Shelter - improvised fighting position
AB14-088	Natural Cave Rock Shelter - improvised fighting position
AB14-089	Natural Cave Rock Shelter - improvised Army I-type fighting position
AB14-090	Natural Cave Rock Shelter - largely destroyed

Artifact Site / Small Find #	**Artifact Description**
AB14-SF065	US Water Canteen Inscribed 'CORBI'
AB14-SF066	US 60mm '18 to Bundle' Cloverleaf Ammunition Container Lids

As the bulk of the 321st RCT struck out east either side of the 321st Infantry Trail on the 25th September (D+10), the 5th Marine Regt passed through their front lines and continued north following the West Road (Hough 1950: 116). By dusk, the 1st Bn had secured the northern IJ radio station area and as the men established a defensive perimeter for the night they received their first taste of what awaited them in the ridge system 300 yards in front of them. Throughout the night, 1st Bn were subjected to three infantry attacks supported by heavy machine gun, mortar and mixed caliber artillery fire from concealed positions in and around Hill Row #1.

Hill Row #1 is the first of five semi-independent peaks that form the cross-bar of an inverted T-shaped mountain range known as the 'Chemiangel' (often termed Amiangal in US wartime historical accounts). The four semi-independent peaks most visible from the south were named 'Hill Row' by the 321st RCT and numbered 1-3 from north-west to south-east with the most easterly and most separate domed height christened 'Radar Hill' on account of the IJ equipment located on its summit and in its caves (*ibid.*: 118). The fifth peak is not mentioned or named specifically in any accounts of the battle of Peleliu and is set out of alignment and slightly north of the main Hill Row summits, tucked between Hill Row #2 and 3. Topographically it is connected to the main Chemiangel ridgeline and, as such, forms the most southerly, south-eastward curving toe of the narrow ridge system.

Bolstered by the arrival of reinforcements from the main islands in the Palau group on the 23rd September, the US 5th Marine Regt faced over 1000 IJA and IJN troops fortified in some of the most sophisticated caves and tunnel systems constructed on Peleliu (180 reinforcements from the 6th Company, 2nd Bn, 15th Infantry Regt; c.600 men of the IJA's 346th Independent Infantry Bn & 1st Bn, 2nd Infantry Regt and c. 300 men of assorted IJN

Construction and Guard Bns) (USAHEC 1946b: 109 & 112-113). It was this strong force that had attempted to push the 1st Bn, 5th Marine Regt back overnight on the 25th September and it was against this same conglomeration of units that the 1st Bn moved against at first light the following morning. As they approached from the south, Hill Row #1 presented a near vertical cliff face studded with concealed firing positions to the 1st Bn (Figure 106) which prevented a direct assault and forced the Companies to split around either side of the rock and attempt ascents up the slightly shallower shoulders (Hough 1950: 118-119). In these draws they came under heavy fire from automatic weapons, 37 and 75mm field guns, all carefully positioned for maximum effect and coverage across the narrow, sloping terrain.

Figure 106 - The vertical face of Hill Row #1 showing evidence of the firepower used to reduce its concealed caves

AB14-051 IJ Field Gun Emplacement

A roughly circular emplacement measuring c.5m in diameter, situated on the south-eastern extent of Hill Row #1's upper plateau. A coralline-limestone rubble revetment wall surrounds the emplacement and survives to a height of c.1m with an entrance break on the north-eastern side. Approximately 3m east of the site, an IJA hand cart frame was located: no wheels or axles were observed. The emplacement contains an in situ IJ 75mm Type 95 Field Gun with its barrel orientated to the south-west (Figure 108). This weapon had a 50° traverse and a range of 11,000m (War Dept. 1944c: 223) allowing it to comfortably cover the approaches to, and draw between, Hill Row #1 and #2 from a southward attack. The artillery piece has suffered considerable battle damage with four impact detonations from shape charge projectiles (most likely US 2.36" HE AP rockets) visible on the front of the gun shield

as well as numerous punctures and dents from small arms projectiles (Figure 107). The muzzle end of the barrel has been entirely destroyed: a sharp outward angling break indicates a demolitions charge placed inside the barrel has been the cause of this damage and was likely detonated to render the weapon unserviceable. Part of the sliding breechblock mechanism also appears to have been removed and an expended 75mm cartridge case has been driven into the open breech. The combination of this evidence would indicate that the weapon came under fire from advancing US troops armed with M1 or M9 'bazooka' rocket launchers. The presence of small arms damage across the shield could suggest that the field gun was being manned at the time. A systematic 'spiking' of the gun has then been carried out following combat, most likely by US personnel once they had overrun the position.

Figure 107 - AB14-051: shape charge impact damage on 75mm Type 95 gun shield

This particular piece may be that mentioned in the citation for a Bronze Star Medal with Combat 'V' which was awarded to Sgt. (then Private First Class) Robert A Montgomery, HQ Company, 1st Bn, 5th Marine Regt following his actions on 26th September 1944. Separated from the rest of his unit during an advance on Hill Row #1, Montgomery observed a 75mm field gun being maneuvered into position. He engaged it with nine rounds from his bazooka and successfully put it out of action (AWON 2008). Montgomery went on to fight on Okinawa where he was killed in action, earning a posthumous Silver Star for his actions there (*ibid.*).

AB14-051 is closely associated with AB14-052 and AB14-053, and most likely formed an artillery battery with a similar gun emplaced at AB14-053, 34m to the north. The modified natural cave AB14-052 lies between the two emplacements and was found to contain a large cache of 75mm projectiles indicating its use as an ammunition store for the guns as well as a personnel shelter.

Figure 108 - AB14-051: 75mm Type 95 field gun in context with emplacement

AB14-052 Artificial Cave - Army Y-Type (a)

This large cave most closely conforms to Phelan's Army Y-Type (a) with three identifiable entrances (Phelan 1945: 24). The two entrances, facing the west and north-east respectively, are completely blocked (the sloping nature of the fill may suggest that they were blocked from the outside) with a line of rubble filled metal drums forming a barricade across the western entrance passage where it joins the main chamber. This barricade may suggest this to be the primary combat entrance of the cave. The single entrance (A) that still remains open faces east and appears to have been constructed through the improvement of a natural fissure in the rock measuring c.6.70m in height. It is accessed via a level, 3m wide avenue protected by flanking coral rubble revetment walls which leads roughly towards AB14-051 and would be wide enough to accommodate a 75mm artillery piece. A small, natural rock alcove (c.4x2m) to the south of entrance A may have been modified to form an improvised defensive fighting position with a commanding field of fire to the south (Figure 109).

Figure 109 - AB14-052: entrance avenue and defensive fighting position niche

On the north side of the fissure, the roof quickly drops to form a semi-circular entrance (c.1.6x2.3m [HxW]) that opens into the main passage (Figure 110). Scorch marks are present along the extent of the 6.5m long passage. A spur branching to the north-east leads into a tall, broad, long passage (8.60x2.10x2m [LxWxH]) which terminates at the north-eastern blocked entrance. To the west, the main passage opens into the main central chamber (6.01x4.18m). A large assemblage of IJ individual field equipment and domestic ware such as rice bowls, mess kit containers and trays, water canteens, broken glass bottles and a respirator (gas mask) canister were found in the main chamber indicating that this was the main living quarters for a large number of individuals. Material associated with field artillery such as unfired 75mm projectiles, tools (spanners), spare parts and ammunition containers were predominantly located in the main passage, near entrance A and along the blocked north-eastern entrance passage (Figure 110) indicating that these areas were used for artillery ordnance and equipment storage. The presence of such a large quantity of 75mm material would suggest that this cave served as a store and shelter for IJ artillery crews manning field guns emplaced at sites AB14-051 and AB14-053.

Main passage looking towards entrance A showing spread of 75mm projectiles along southern part of floor

Metal drum barricade in main chamber

Assemblage #1: IJ equipment in main chamber

Metal spanner in assemblage #4

75mm ammunition container in assemblage #3

Figure 110 - AB14-053: cave interior and details of artifacts

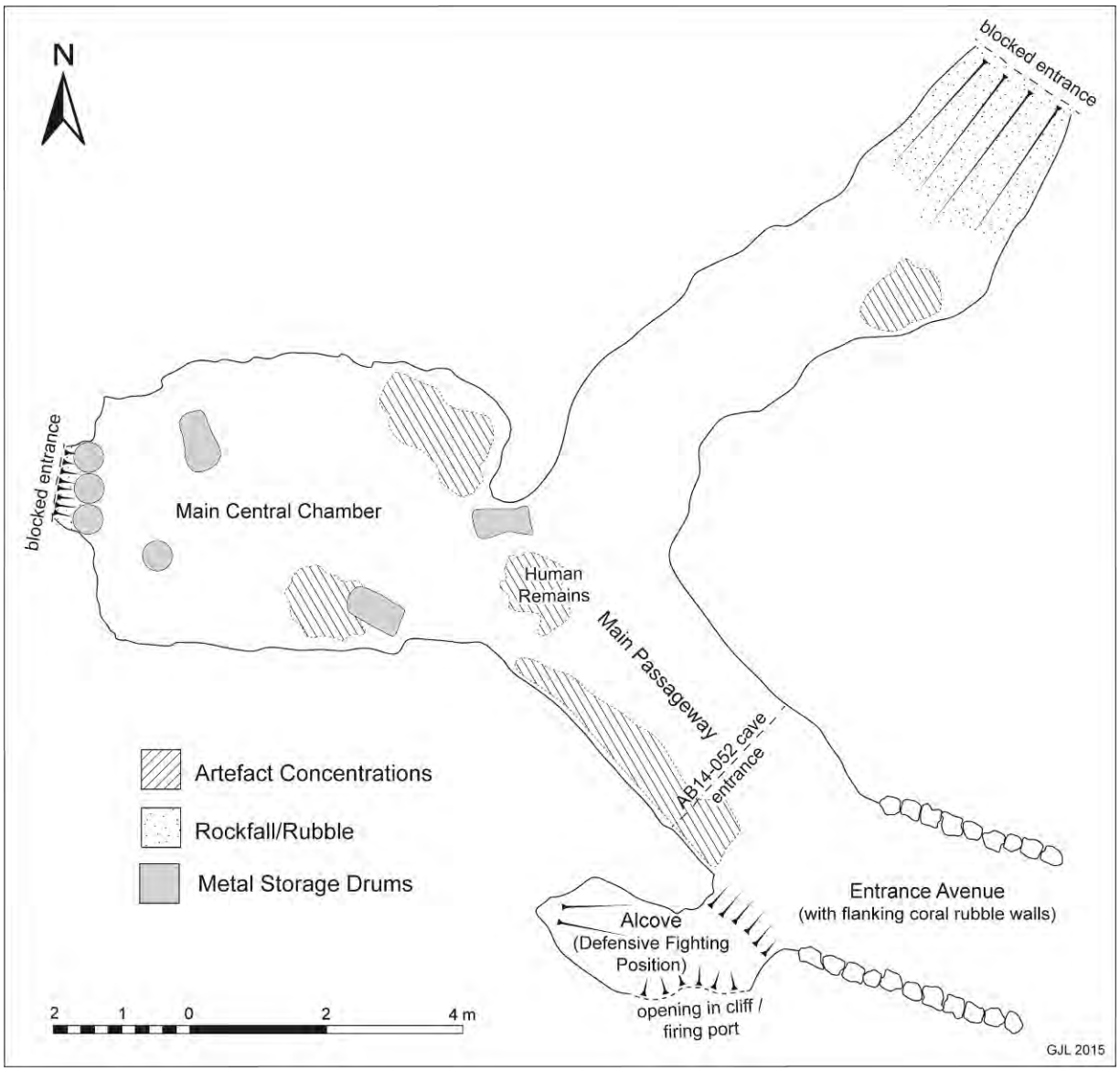


Figure 111 - AB14-052: cave interior floor plan

Artifacts Noted:
disarticulated human remains • broken glass bottles • IJ gas mask canister • IJ canteens & mess kits • IJ unfired 75mm projectiles • IJ medical kit • IJ metal rice bowls • glassware • batteries • IJ porcelain sherds • IJ metal 75mm ammunition containers & spare parts boxes • metal spanners • metal drums

AB14-053 IJ Field Gun Emplacement

A rounded rectangular depression (5.75x4.31x1.72m [LxWxD]) aligned north-west to south-east was observed hewn out of a coral rock outcrop 34m north of emplacement AB14-051. A shallow gradient entrance was noted on the south-east side facing towards AB14-051 and 052. A levelled, wedge-shaped slot extends from the center of the north-west edge and appears very similar to embrasure slots found in concrete artillery casemates. The form and dimensions of the site echo those of coral and log constructed casemates found and recorded elsewhere on Peleliu following the battle (NARA: 127-306- C1-2a) (Figure 112). It is

quite likely that this site was a similar type of timber revetment casemate dug into the hillside. The interior area of the site is large enough to accommodate a 75mm field gun similar to that found at AB14-051 which would have had a broad field of fire down the north-west slope of Hill Row #1 and out onto the main north road. This could have been the position for a second 75mm gun forming a battery pair of guns with that found at AB14-051 or a secondary position for the aforementioned gun, both of which were served by cave AB14-052.

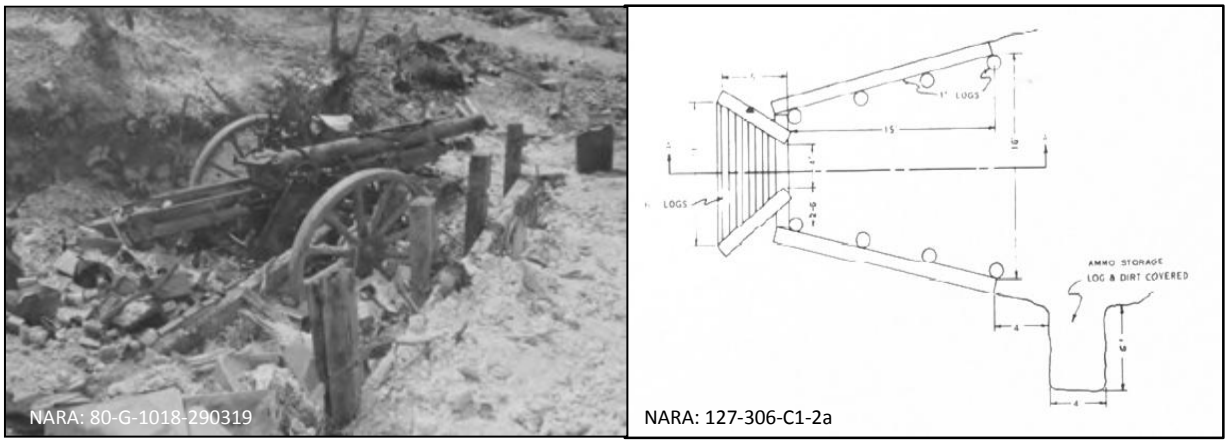


Figure 112 - A coral and log casemate similar to AB14-053 found at the mouth of The Horseshoe/Mortimer Valley

AB14-054 Improved Natural Cave - Balcony-Type

An improved natural cave which does not clearly conform to the main cave type classifications as defined by Phelan but bares most resemblance to a balcony-type or U-type with expanded central niche. Two entrances (A & B) provide access at either end to a 6.88m long main passage with a single branch passage extending into an L-shaped central niche chamber roughly half way along its length. Both cave entrances have levelled areas at the openings which could have served as weapons platforms for mortars. A's platform is set into the base of a deep depression which conceals the entrance from view and B's platform is open with clear views to the north and north-east. Two embrasures cut through the rock face from the central niche chamber covering the entirety of this platform and the slopes of Hill Row #1 leading up to the cave. Entrance B (1.6x1.8m [WxH]) opens to the west onto this platform and is obstructed by a barricade of concrete-filled wooden barrels (Figure 113). All timberwork of the barrels has disintegrated leaving only the concrete fill which exhibits the cast impression of the staves. Two remain intact: one standing in situ, the other lying next to it with considerable concrete rubble of others spread across the sloping floor nearby. A concrete filled metal drum forms the end of a low coral rubble revetment wall built across

the passage c.2m further in from the barrel barricade. This may have formed part of a second, interior defense line high enough to provide protection for a crouching rifleman or machine gunner.

The cave features a semi-circular niche (2.27x2.68m [WxD]), which lies opposite the east facing entrance A. The central niche chamber measures 5.95m in length and 4.48m at its greatest width with a platform on the north side (1.3x1.3m) which provides access to the first of the two embrasures. Both embrasures are located on the north side of the chamber overlooking entrance B. A single concentration of artifactual material was encountered which lies on the east side of the cave immediately to the north of entrance A. This consists of IJ mess tins and sake-type bottles.

Artifacts Noted:
broken aqua-blue glass sake-type bottles • IJ mess kits • metal peg • combat boot sole

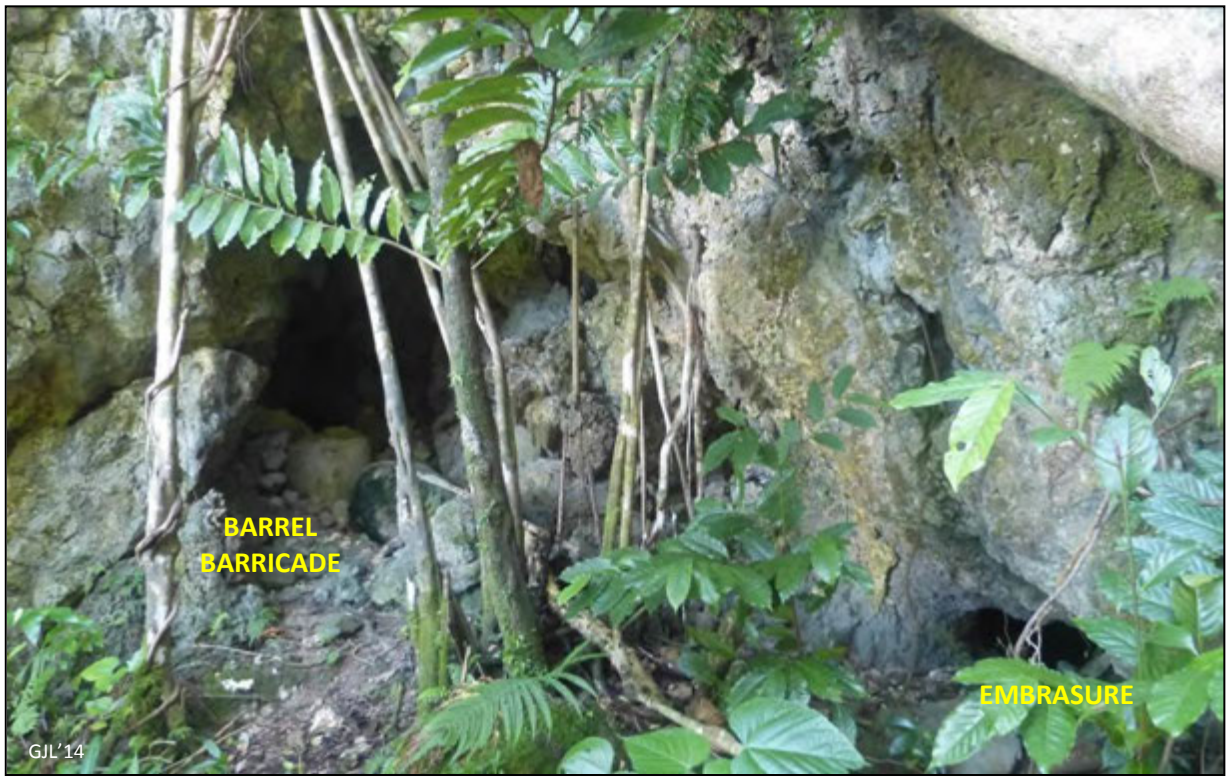


Figure 113 - AB14-054: entrance B showing concrete filled barrel barricade and rock cut embrasure

AB14-055 Improved Natural Cave - Balcony-Type

By far the most elaborate cave encountered during the 2014 survey, this site most closely resembles the balcony-type: a highly varied class that often stretched around the sides of hills at high elevations utilizing natural cavities, fissures and pockets in the porous coralline limestone as passages, chambers and firing positions (Phelan 1944: 28-33). This is a multi-

level cave situated on the north-western slope of Hill Row #1 with three entrances: the primary being A which faces north-east, with a wide, tall mouth (3.50x2.60m) utilizing augmented rocky outcrops as defensive revetment. A very small (0.70x0.70m) entrance (B) is concealed behind a boulder further round to the south-west from entrance A and leads into a small lower level chamber; it was likely intended as an escape route. A pair of in situ reinforced cast concrete embrasures (0.90-1.20m wide x 0.45-0.50m high) have been constructed into the curving promontory of the cliff face c.5.25m north of the main entrance and form a highly effective pillbox. Accessed only from the main passageway within the cave, the pillbox commands the northern approaches to Hill Row #1 with a sweeping field of fire from the west through to the north-east. The third entrance (C) is a broad opening onto the near vertical south-west face of Hill Row #1 with extensive views across the modern day village of Kloulklubed, the northern IJ radio station building (AB278) and the northern part of West Road beyond. This opening is visible in historical photographs (Figure 106), and judging from the level of 'combat landscaping' carried out by US forces across this area of hillside, it is likely that the present opening is greatly different from that originally constructed by IJ forces prior to the battle. With its spectacular views out across the approaches to Hill Row, it is easy to imagine this as a key observation post for coordinating the multi-caliber bombardment and infantry attacks that took place on the 1st Bn, 5th Marine Regt positions during the night of 25th September.

The cave itself is complex, existing on three levels and is best described by way of the sketch plan in Figure 114. Entrance A and C provide access at either end to a winding main passageway. Like a warren, the passageway undulates up and curves down through the hillside with the largest chamber (4.44x2.03x2.42m [LxWxH]) and a small niche located at the midway point in the heart of the hill. The upper level consists of a series of three galleries all of which are accessed from the main passage, varying in size and mostly natural with jagged stalactite ceilings. Two chambers exists on a lower basement level: the first being the previously mentioned pillbox located down a short, open ceilinged passage near entrance A and the second, smaller chamber (1.73m diameter) containing the escape entrance (B), located down a much steeper, narrow passage near entrance C. Artifacts were scarce despite being such an extensive cave and only two small assemblages were located in and around the central chamber. The domestic nature of assemblage #1 would suggest the chamber had

been used as living quarters for the defenders. A cache of 50mm Type 89 mortar bombs would also indicate that entrance C may additionally have served as a mortar firing position.

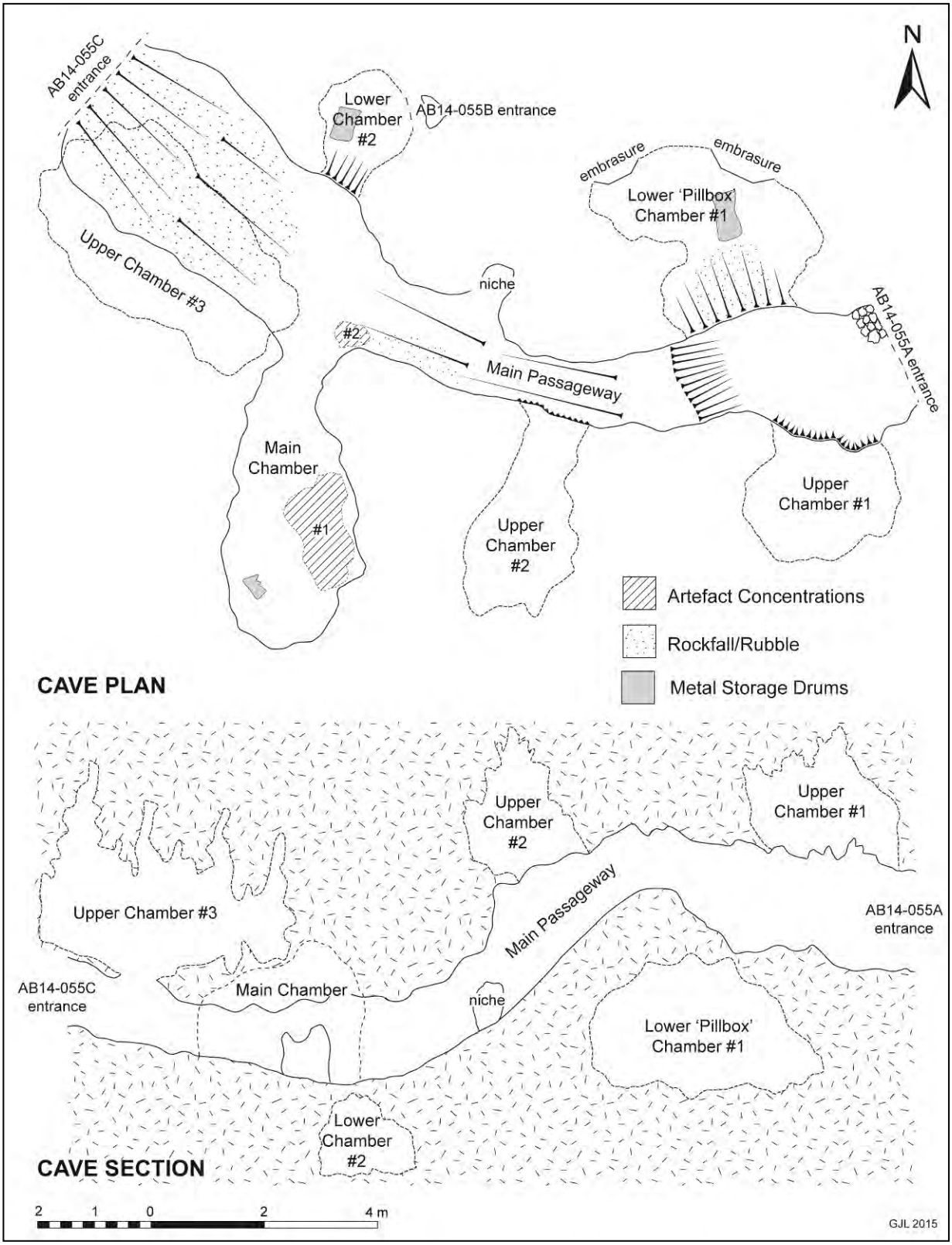


Figure 114 - AB14-055: cave interior floor plan and section drawing through main passageway

As it is located at the heart of Hill Row #1 and given its elaborate defensive and offensive capabilities, this cave complex was clearly an important element of the IJ defenses which

could have provided shelter and firing positions for a considerable number of men. The numerous fire ports within AB14-055 testify to its effectiveness, and the excellent viewsheds that the cave affords to the south and east would have provided IJ forces with ample opportunity to harass the marines with small arms fire. Scorch marks from a flamethrower around entrance A and the pillbox embrasures indicate some of the methods employed to try and clear the cave (Figure 115). It is almost certainly one of those mentioned by Hallas (1994: 190-1), who describes multi-level, multi-entrance cave complexes constructed by the IJN 214th Naval Construction Bn that were almost impervious to point-blank tank fire.

Artifacts Noted (by assemblage #):
#1: metal bowl • soap dish lid • various glassware shards • metal ration cans **#2:** unfired IJ 50mm Type 89 mortar bombs

Figure 115 - AB14-055: entrance A pillbox embrasures showing flamethrower scorch marks

AB14-056 Artificial Cave - Army U-Type

This U-shaped cave is located at the foot of Hill Row #1 with both the primary combat and secondary personnel entrances facing west. Only the southernmost entrance is accessible via a steep downward slope of loose coral rubble. This entrance is low and irregular (1.50x0.80m [WxH]); it descends into a 7.90m long main passage. A small alcove (likely for a lamp or candle), with evidence of localized burning to the walls near the top, is set into the cave wall as it curves down from the entrance into the main passage. The main passage is uncharacteristically large for an Army constructed cave (3.12x2m [WxH]) but features the uneven, hastily finished appearance typical of this type. Two shallow niches exist opposite each other half way along which would have offered partial concealment or additional storage space. Eye-hooks and handles, presumably to hang equipment and aid movement around the cave, can be found at irregular intervals throughout the cave interior. Scorch marks and general blackening of the walls and ceiling around the blocked northern entrance

suggest that it was the focus of the attack which involved a flamethrower prior to the blocking event. The cave has been heavily disturbed and contains a significant quantity of modern household waste including empty food tins and glass bottles. Small fragments of 1940s glass were observed amongst the modern material and a small quantity of IJ 6.5mm ammunition was found concentrated at the northern end of the cave opposite the blocked entrance. The flame damage and unfired ammunition cache would suggest that the blocked northern entrance was the primary combat entrance.

Artifacts Noted:
eye-hooks and handles embedded in cave wall • unfired IJ 6.5mm ammunition • assorted glass bottle shards • Marston matting and an unfired IJ 50mm Type 89 mortar bomb outside entrance • modern domestic household waste including glass beer bottles and food cans

AB14-057 Natural Cave Rock Shelter

This substantial natural cave is situated high up in the sheer, south-western cliff-face of Hill Row #1. The site was only accessible with the aid of climbing ropes and safety harnesses and was investigated by Raffield and Ashlock following a thorough safety inspection by members of the CGD team who had installed a rope line as part of their ERW sweep of the area. Calcium accretion across the sloping, smooth, uneven cave floor made for a slippery working environment which restricted the survey to areas that could be accessed whilst attached to the safety rope (Figure 116).

Figure 116 - AB14-057: showing cave entrance, smaller openings either side & CGD safety rope lines

A single, linear main passage extends back c.7.41m from the tall (3.19m), fissure-like cave opening broadening slightly from 2.13m to 2.37m before sloping steeply upwards towards the rear. The floor of the rear half of the main passage consists of three increasingly steep shelves that terminate at the back wall. To the right (SE) of the entrance lies another, smaller arch-shaped 'entrance' (1.29x1m [WxH]) with an even smaller opening in the cliff face to the immediate south-east of it; both appear to be entirely natural. A small passageway (c.1.20m wide) branches to the east out of the main passage, extending a short distance upwards at a moderate incline before opening out into a roughly circular natural chamber (c.5.34m diameter). The floor of this chamber is uneven and generally slopes downwards to the south, and measures c.5.34m in diameter. To the left (NW), c.2m into the main passage from the main entrance lies a small opening in the cliff face which looks out to the west.

Although no artifacts (other than two possible metal shrapnel fragments) were found in the cave, the small openings either side of the entrance and the cave mouth itself provide an extensive, broad viewshed from the south-west to the south-east with opportunities for concealment, observation and fire on hostile forces in the broad southern direction. Lack of evidence for improvement to the natural cave architecture or material evidence of human activity make for an inconclusive site interpretation, however, its use as an improvised fighting position cannot be ruled out.

Artifacts Noted:
small metal shrapnel fragments

AB14-058 Artificial Cave - Army Y-Type (b)

One of the more unusual artificial cave types constructed by the IJA, this Y-type (b) is situated on the southern foot of Hill Row #1 with a single, south-westerly facing entrance (2.30x1.05m [WxH]) accessed up a steep, loose rubble slope. The ground along the base of Hill Row #1 in the immediate environs of AB14-058 has witnessed considerable post-battle landscaping which likely took place as part of levelling activities related to the construction of the Quonset hut village Kloulklubed (as depicted in historic photographs) in 1946 (Murray 2006: 207). Much of the steep rubble slope that leads up to, infills and cascades down the interior main passage of the site likely dates to this post-battle phase, therefore altering the overall appearance of the cave mouth from how it may have appeared during and immediately after the battle.

Inside, the main passage forks quickly into two diverging passages that form the Y-shape in plan (see Appendix 4 for site plan). The northern (left hand) fork is straight with a large metal cooking bowl and a metal drum located at the far end. Rubble as well as broken and intact amber glass sake-type bottles lie strewn throughout this passage which appears to have been quite heavily disturbed. The north-eastern fork opens out at the terminus into a large niche (6.20x1.70m [LxW]) which also exhibits signs of disturbance, but to a far lesser extent than the left hand fork. Despite the disturbance, artifacts of note were found throughout the cave, the most informative of which were located in the niche amidst assemblages #1 and 2. Two types of IJA respirator (gas mask) canister suggest the use of the cave by IJA personnel one of whom had worn standard issue IJ horn-rimmed spectacles. An unusual selection of ordnance including rare IJ 8mm pistol ammunition was found near the spectacles which may be indicative of an IJA Officer once occupying the cave (Figure 121). Fuses, split cartridge cases for 75mm projectiles and a gunner's quadrant (Figure 117) are present amongst assemblages 1 and 2 offering a clear indication that the cave served as a crew shelter and ammunition store for a field gun of 75mm caliber. Scorch marks evident on the undulating walls and roughly rounded ceiling of the main passage as well as charred residues on some of the less disturbed artifacts imply that a flamethrower was used in the clearance of the cave. Burnt, cut timber, corrugated metal sheet and a US type communications cable drum are near the fork in the main passage and have likely been deposited post-abandonment; the sheet metal maybe originating from the post-war Quonset huts that were located nearby.

Figure 117 - AB14-059: gunners quadrant, calibrated from 0° to 90°. Relative mounting position on 75mm field gun shown on right

This cave features in a post-battle intelligence report compiled by the US Marine Corp Photographic Intelligence Unit which contains photographic evidence confirming the operation of a 75mm Type 95 field gun in an anti-tank role from this cave (NARA: 127-306-C1-2a). Figure 118 depicts the field gun in position after being wheeled out of the cave and also serves to demonstrate the scale of landscaping that has taken place since 1944 as well as how much of the entrance has been blocked by rubble. Interior photographs of the left and right forks of the cave (Figures 119 and 120) provide an unheralded opportunity for comparison between 1944 and 2014 starkly showing the extent of disturbance that has taken place. In the left hand passage (Figure 119), it would appear that the pile of material visible in the historical photograph is almost entirely gone or has been moved with only the metal drum, visible in the rear left corner, still in situ. Where material does still survive it is concentrated now on the right side of the passage and this is most likely a result of looting activity where individuals have moved discarded objects to the side whilst sorting through the pile, looking for objects of greater interest or value. The scale of disturbance in this cave is not surprising given its relative accessibility being in close proximity to main roads and the principal population center. Given these factors it is perhaps more remarkable that sufficient evidence remains, some of considerable rarity, to enable a good understanding to be gained of the cave's function, occupation, abandonment and post-war disturbance history.

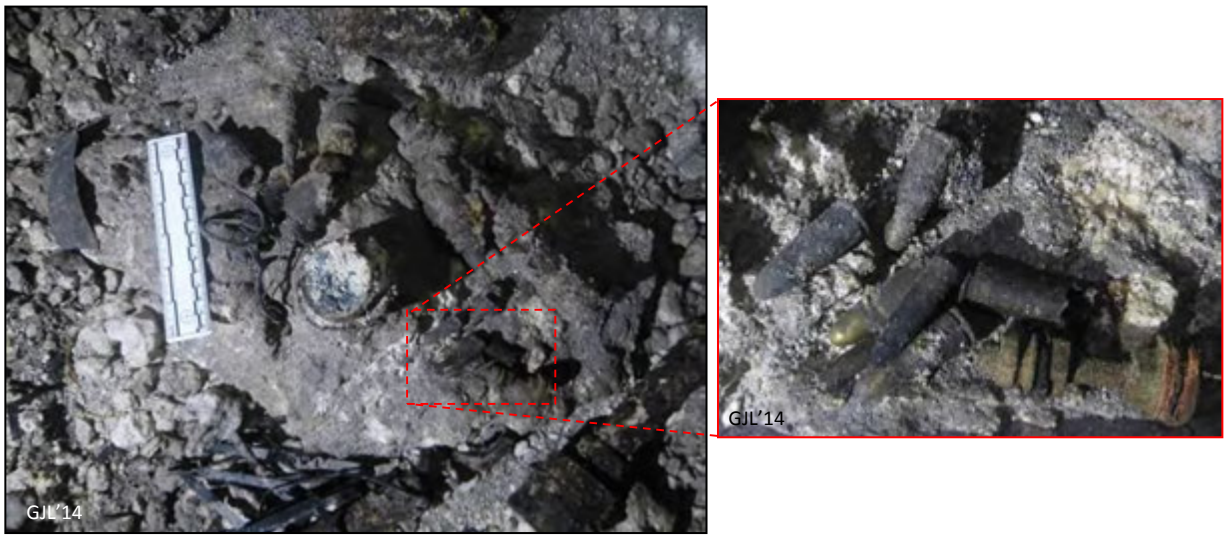
Artifacts Noted (by assemblage #):
Outside entrance: IJ water canteen • corrugated metal sheet **Main passage:** metal T-bar socket spanner • sealed amber-glass bottle containing clear liquid • twisted metal fragments **#1:** magnesium strips • IJ horn-rimmed spectacles • misc. charred metal objects • IJ artillery projectile fuses • heavily corroded unfired rifle projectile • IJ unfired 8mm pistol ammunition **#2:** metal ration cans • broken and complete amber-glass bottles • IJA 'model 95' & '99' gas mask canisters **#3:** small metal rice bowl • corrugated metal sheet • unidentified corroded metal object • modern plastic bottle • burnt painted timber • amber-glass bottle **#4:** twisted metal fragments • burnt timber • US communications cable drum • broken and complete amber-glass bottles **#5:** large cooking bowl • metal storage drum • broken and complete amber-glass bottles

Figure 118 - AB14-058: cave entrance showing 75mm Type 95 field gun & post-battle landscaping

Figure 119 - AB14-058: comparative images of left hand passage showing artifact disturbance

Figure 120 - AB14-058: comparative views of right hand passage looking from cave entrance

Assemblage #2 in right hand passage niche: IJA gas mask canisters, sake-type bottles and 75mm cartridge cases



Assemblage #1 including horn-rimmed spectacles and artillery fuses with detail of IJ 8mm pistol ammunition

Figure 121 - AB14-058: material assemblages and artifact detail

AB14-059 Destroyed Improved Natural Cave

A series of augmented recesses (A-D), varying in depth, located either side of a natural fissure in the cliff face form this site which appears to not only have been heavily disturbed by post-battle landscaping and more recent human activity but also displays evidence of sustained damaged during the course of the battle. Large rubble boulders can be found strewn across the flattened low ground to the south-west of the recesses and around the cave openings.

Recesses A & B provide access into a single, central chamber (6.77x4.99m [LxW]) forming a small, roughly Y-shaped cave in plan. The wide but low entrance A (4.23x1.36m [WxH]) faces

south-west, while entrance B (3.38x2.57m) faces west. This central chamber itself is very low, immediately becoming shallower on entering and continuing to reduce in height to its north-eastern (back) wall. The floor, walls and ceiling are uneven and do not seem to have been improved or altered by human endeavor in any way. Both entrances were obstructed by large coralline limestone rock boulders and fallen rubble debris. A large quantity of modern domestic waste littered the central chamber amongst which a single unfired IJ 50mm Type 89 mortar bomb was found.

Uphill, to the north of the fissure, are recesses C and D as well as a small semi-circular alcove (1.63x1.16x1.71m [WxHxD]). Recess C forms the main access into an irregular S-shaped cave in plan with C lying at the base of the S. The narrow entrance passage extends for c.2.11m before opening into an irregular single chamber with two niches to the northern and southern sides. The northern niche (3.83x1.60m [LxW]) was partially blocked by a large boulder whilst the southern niche (4.25x2m [LxW]) arguably forms a continuation of the main passage as it appears to terminate in a very small possible entrance (large enough only to crawl through) at its eastern end. No obvious evidence of deliberate improvement to the otherwise natural architecture of the main chamber was apparent. A single, metal narrow gauge railway track rail c.2m in length was found embedded in the ground at an upright angle immediately in front of C. All areas of this cave were artifactual sterile other than a considerable quantity of modern domestic waste spread throughout. Recess D is located c.4.23m north-east of C and is a shallow, semi-circular feature (1.73x.34x1.57m [WxHxD]) of similar form to the natural rock shelters found in Area A. There were no finds associated with this recess.

The extensive damage and disturbance to the site has made general interpretation and the assessment of site form and function difficult. It remains unclear whether the four recesses represent surviving elements of a largely destroyed single cave or two partially destroyed smaller caves located either side of the fissure. If the site represents two partially destroyed caves then they would likely have proved inefficient as fighting positions as insufficient space exists for personnel, equipment and movement. The single 50mm mortar bomb suggests that the position was occupied while the significant quantities of large rocks scattered across the site imply that the site was subject to a significant bombardment by large-caliber gun fire. This fire may have originated from the 155mm artillery of Battery C, 8th Gun Bn that operated

in this area at point blank range against caves around the 27th September 1944 (Gayle 1996: 31). The fissure may have caused a natural weakness in the rock that contributed to such a total destruction of the site.

Artifacts Noted:
unfired IJ 50mm Type 89 mortar bomb • modern domestic household waste • corrugated metal sheet • metal railway track rail embedded vertically in ground in front of entrance

AB14-060 Artificial Cave - I-Type

This simple, I-shaped cave is situated on the southern slope of Hill Row #1 and features a single, south-west facing entrance (1.10x1.90m [WxH]) partially protected by a coral rubble revetment wall at its mouth. Directly above the cave mouth, the rock is blackened with the scorch marks left by a flamethrower indicating that this cave came under attack from this weapon type during the battle. The interior floor area of the main passage is level with undulating walls and ceiling. The passage extends c.4.1m into the cliff face before widening out at a right angle into a small niche (1.30m deep) on the cave's left-hand side. This would have offered some protection from direct fire by conventional, flat trajectory weapons but would have been of little use against the flamethrower in what was termed by US intelligence personnel as a 'suicide cave' type (Phelan 1945: 13)

AB14-061 Improved Natural Cave Rock Shelter

This roughly circular cave is situated on the mid-upper southern slope of Hill Row #1. It is an unusual cave that appears to make use of a natural horizontal cleft in the rock face but which has then been improved upon with the addition of several artificial features. One such feature is a narrow entrance break (0.90x1.20m [WxH]) facing south-west which cuts through a natural rock ledge. To the immediate west of the entrance is the second feature: a slightly curving coral rubble revetment wall offering additional protection to this more open side of the cave and a potential firing position with commanding views across the approaches to the shoulder between Hill Row #1 and #2. The cave consists of a single chamber (2.36x2.90x1.70m [LxWxH]) of uneven, undulating floors, walls and ceiling with an expansive rock-shelf on the south-eastern side that creates a broad narrow opening reminiscent of a pillbox embrasure which would have offered an excellent field of fire. A slightly raised platform (1.22m deep) exists on the opposite, rearmost side of the cave which serves as a convenient level ledge on which assemblage #1 is situated (Figure 122). This assemblage

consists entirely of unfired, unexploded ordnance of both IJ rifle and artillery caliber. An assemblage of small human remains, appearing to be largely foot bones, is located near an overturned metal storage drum by the entrance break. The third assemblage is situated at the southern end of the rock shelf and is a mixed metal assemblage of corrugated metal sheeting and ration cans.

Like many caves in Area B, this example falls out with the standard typology set out by Phelan and a lack of diagnostic artifacts types make it difficult to determine its function. The reinforcement of a natural rock shelter with a revetment wall is a feature combination also observed in site AB14-102 at the base of Hill B which was interpreted as an ammunition store. This similarity of features with AB14-102, the presence of the 75mm projectiles within AB14-061's artifact assemblages and the lack of a suitable firing position for a 75mm field gun nearby may therefore suggest that this site also served as an ammunition store for the artillery positioned on and around Hill Row #1. The coral rubble revetment and narrow entrance would have provided protection to the storage area from direct enemy fire such as that possibly received from US M4 Sherman Bulldozer Tank C14 (see Figure 132).

Artifacts Noted (by assemblage #):
#1: IJ unfired 75mm projectiles • IJ unfired 6.5mm ammunition **#2:** disarticulated human remains • metal storage drum **#3:** metal ration can • corrugated metal sheet

Figure 122 - AB14-061: cave interior with detail of 75mm projectiles in assemblage #1

AB14-062A-F US Defensive Fighting Positions

As evening approached on 26th September *Charlie* Company, 1st Bn, 5th Marine Regt had barely made headway onto Hill Row #1 having encountered a determined resistance and the well-established defenses (such as those recorded between AB14-51 and AB14-061) that covered the approaches onto the summit. With their small gains proving untenable to hold during the hours of darkness *Charlie* Company withdrew to more favorable positions. B (*Baker*) Company, 1st Bn, 5th Marine Regt had greater success as it advanced on the slightly less imposing height of Hill Row #2 from *Charlie* Company's right flank. The summit was secured by 1400 (Hough 1950: 119) but not before casualties were sustained during the assault from a friendly fire incident. The situation of the 5th Marine Regt's front lines overnight were unusual, to say the least, with the 2nd Bn out on its own forming a perimeter with its back to the sea to the north of Hill Row #1 (Gayle 1996: 30). The 1st Bn surrounded the base of Hill Row #1 on three sides before stretching across the shoulder between, and looping around the summit of, Hill Row #2 before linking with the 3rd Bn positions down on the east-west Hill Row road (Hough 1950: 119).

A series of nine sub-circular features with coral rubble revetments were identified forming a rough line across the 'military crest' (a line along a hill slope where maximum upward and downward observation is possible) of the shoulder between Hill Row #1 and #2 (Figure 123). Their form closely corresponds with other US skirmisher trenches encountered in Area A during PAS'14 and, given their location, it is highly likely that this group formed part of the 1st Bn, 5th Marine Regt's night perimeter positions constructed on 26th September. Site A and E, at either end of the line, are large and sub-rectangular in plan (3-4x2-2.50m) with a single course of loose, hastily placed coral boulders forming a perimeter parapet. C and D are smaller, more circular examples (c.2x3m) of similar construction. B and F are the exceptions to the pattern with site B consisting of a 2.23m wide, crescent shaped parapet located on the southern lip of a small bomb crater (4.23x0.90m [Diameter x D]) and site F being a very large circular position (4.40x4.46x1.22m) with a single course parapet. Positioned on the flanks of the group, the larger, more rectangular sites A and E could have served as squad or company support weapon positions with the smaller sites B, C and D occupied by riflemen (Figure 124). Being altogether larger than the others, site F may have served a different purpose. A single expended .50 cal cartridge was identified in the base of this position and may indicate that this served as a hasty emplacement for a Browning .50 cal M2 heavy machine gun (HMG).

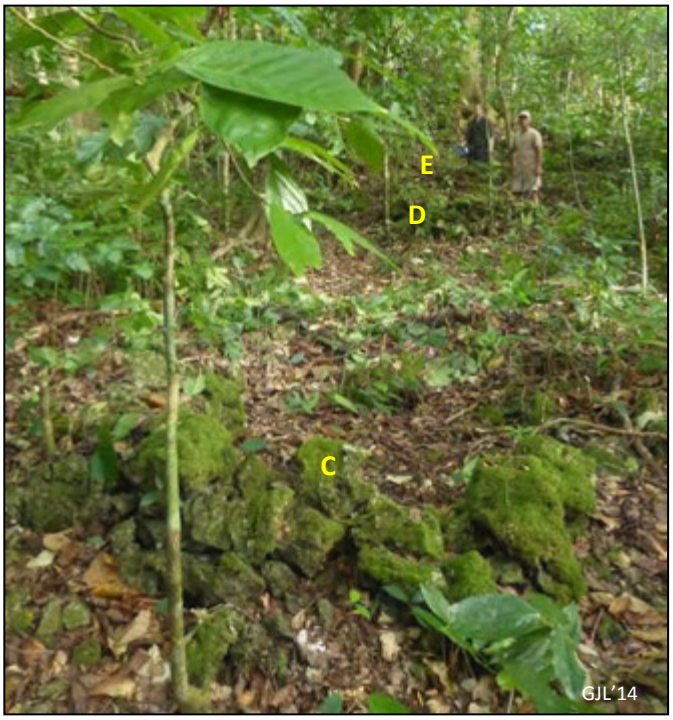


Figure 123 - AB14-062: line of US defensive fighting positions showing sites C, D and E

Figure 124 - AB14-063D (right) and Marines sharing a similar hasty fortification on Peleliu

AB14-063 Artificial Cave - Army L-Type

This cave is an incredibly unusual type that most closely resembles Phelan's L-type (1945: 20) and is situated on the north-eastern slope of Hill Row #1 with no real field of fire to speak of. It is accessed through a narrow, east-facing defilade which has been partially improved with a coral rubble retaining wall where it opens onto the hillside. The narrow, triangular slot of an entrance (3.91x0.83m [HxW]) opens into a steadily downward sloping passage (1.83x5.39m [WxL]) which levels out before turning left (west) at a 90° angle for 3.85m before making another 90° turn to the right (north) into the main chamber (6.44x3.09x2.22m [LxWxH]).

In addition to its unusual architecture, the cave contains a remarkably intact and expansive material record which is spread throughout the interior. Six main concentrations were identified with key objects inventoried and listed in the table below. Assemblage #1 is particularly noteworthy for the presence or large cut timbers, one of which appeared to still be in situ positioned vertically from floor to ceiling (Figure 125). It is highly likely that these timbers formed cladding for the walls and/or floor. Although Phelan noted that cave cladding was used in storage caves as damp proofing and in living areas for enhanced comfort (*ibid.*: 26), no examples of in situ wall cladding have yet to be found during an archeological survey of Peleliu. The remains of this architectural feature therefore makes this cave an incredibly rare and important example indeed. Also within assemblage #1 a square of yellowed plastic was found. When a light was placed behind the object, inscribed centrally, diverging lines were observed which are reminiscent of a protractor (Figure 126). The most likely interpretation of this object is an IJ range finding chart, an incredibly rare discovery indeed.

The primary purpose of the cave appears to be shelter and storage rather than defense. The cave lies concealed on the northern side of Hill Row and does not possess the extensive field of fire characteristic of the combat caves on the south-western slopes. This cave is situated c.40m to the north-east of the IJ artillery battery AB14-051 & 053 and the presence of the range chart indicates that the troops occupying the cave may have served in one or both of the artillery batteries in the vicinity. No ordnance of any kind was identified in this cave and many of the artifacts are of a domestic or personal nature suggested corroborating the theory that this was a personnel shelter used as living quarters for IJA forces engaged in the defense of Hill Row #1.

Figure 125 - AB14-063: main chamber showing in situ wall cladding timber and others collapsed across the floor

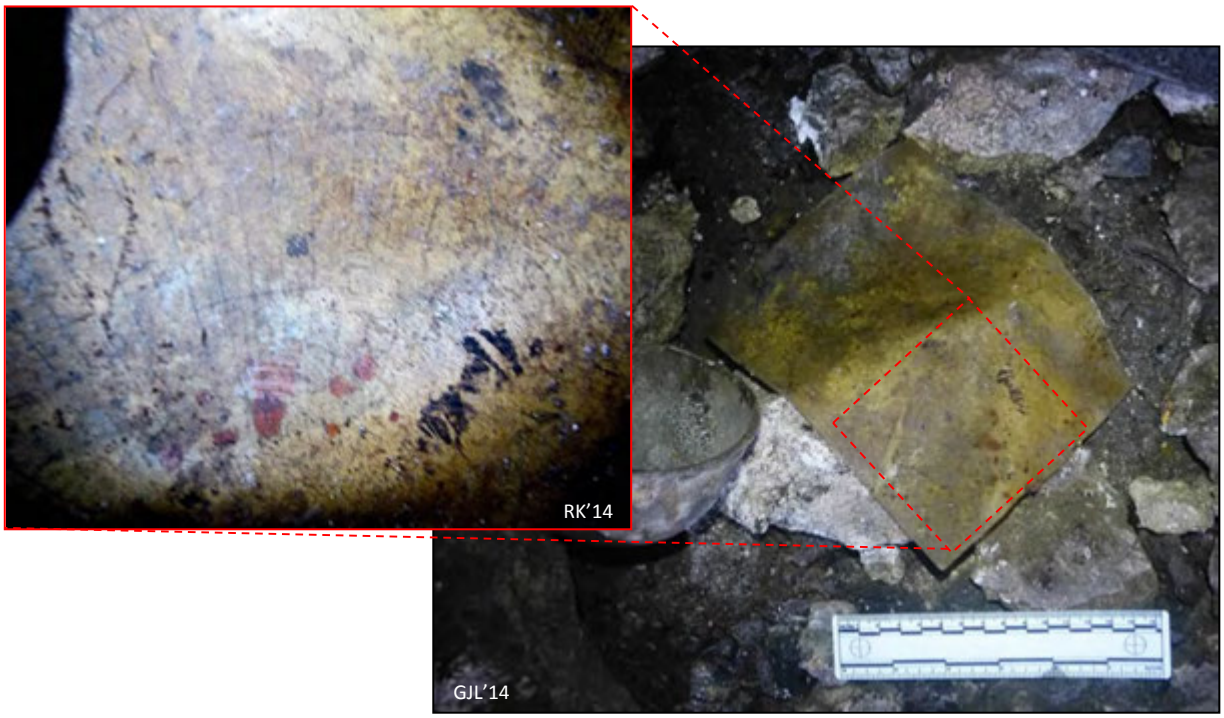


Figure 126 - AB14-063: context and detail of IJ range finding chart

Artifacts Noted (by assemblage #):
#1: structural internal wall/floor cladding timbers • charcoal briquettes • IJA 'model 95 & 99' gas mask canisters • IJ mess kit lid • IJ range finding chart • crumbled metal rice bowls and cups • shovel blade • small amber glass medical-type bottle **#2:** IJ mess kits • large metal IJ rice cooking bowl • broken amber glass sake-type bottle fragments **#3:** small white porcelain tea set **#4:** IJ mess kits •IJ rice bowls **#5:** broken porcelain fragments • pick-axe head • misc. twisted metal fragments • **Main Passage:** metal storage drums

AB14-064 **Improved Natural Cave & Defensive Fighting Position**

Located on the north-eastern slope of Hill Row #1, this natural cave (AB14-064a) features a small, south-eastern facing, inverted U-shaped entrance (2.30x1.30m [WxH]). Approximately 3m to the south-west of the entrance is a u-shaped firing position (AB14-064b) measuring c. 3x4m consisting of several courses of coral rubble. This position was likely served by the IJ personnel occupying the cave, and was perhaps a hastily improvised arrangement to protect the cave and the rearward approaches to Hill Row #1 as the attack unfolded. A lack of supporting artifactual evidence results in this interpretation being based solely on the close proximity to the cave opening. The site morphology is similar to the US skirmisher trenches located elsewhere on Hill Row and so it is equally possible that this was a US position. However, the isolated sighting next to the cave would make this a very unusual placement for a US position unless it was guarding against the reoccupation of the cave by IJ troops.

The cave entrance descends steeply down with what appears to be a naturally stepped coralline limestone floor surface. The short passage opens out into a wide, sub-circular chamber with a low, domed ceiling (c.10x0.60m [Diameter x H]). Towards the north-western end of the chamber lies a large rock (possibly ceiling collapse), beyond which the cave narrows into an upwards sloped entrance to what appears to be a second chamber. The extent of the second chamber is unknown and was not investigated owing to the challenging working environment. A significant depth of cave cricket (*Rhaphidophoridae*) excreta across the floor surfaces in the main chamber hampered ERW identification while swarms of cave crickets across the low ceiling and a snake sighting further added to the hazards of operating in the confined space. As a consequence, only a basic visual survey was undertaken prior to the cave being promptly evacuated. Although it is possible that the cave has been disturbed, a more detailed survey may prove beneficial in the future.

AB14-073 US Defensive Fighting Position

A small, roughly square (2x2m) level platform surrounded by a low, coral rubble parapet wall varying from one to two courses in height around its extent. No artifacts were found in association with the site but the morphology is consistent with improvised US hasty fortifications found across the Hill Row, 321st Infantry Trail and Walt/Pope Ridge areas (see Sections 3.0.2, 3.0.5 and AB14-062 in this section).

AB14-074A US Defensive Fighting Position

The most northerly of two ephemeral oval features formed by a low, single course of crudely positioned coral rubble rocks. This example is a small skirmisher trench (1x1m) with a slightly higher coral parapet to the front (east-south-east) that likely served as a shelter for a single US rifleman of *Charlie* Company, 1st Bn, 5th Marine Regt.

AB14-074B US Defensive Fighting Position

The second of two closely positioned oval skirmisher trenches located c.4m south of AB14-074A. This is a very slight feature with a very low coral rubble parapet forming a protective enclosure c.2x1m in size. This trench also faces east-south-east and is likely contemporary with 074A.

AB14-075 Natural Cave Rock Shelter

A west facing, small natural recess (0.75x0.75x1m [HxWxD]) in a rock outcrop on the crest of the shoulder between Hill Row #1 and #2. The rock face around the site exhibits indentations consistent with large caliber projectile impacts and metal shrapnel fragments were observed with the recess. Although no evidence of occupation is apparent, the shrapnel and impact marks suggest that it was considered a potential threat by US forces operating in this area. It may have served as an improvised shelter or fighting position for a single IJ rifleman or sniper.

AB14-076 IJ Defensive Strongpoint

Situated on the 'military crest' of the shoulder between Hill Row #1 and #2, and with its back to the steep north-western slope of Hill Row #2, this site comprises an intriguing array of field defense features and caves. Three large, natural caves (A & B), two of which are connected, are located slightly upslope from the main draw between Hill Row #1 and #2 and boast broad views across the whole area particularly towards the south-western approaches. The field defense features consist of a levelled coral platform (C) and a wide dog-legged communication trench which links the platform to the lowest elevation cave (A) (Figure 127).

Platform C is a sub-rectangular levelled shelf (3.75x4.76m [WxL]) of compacted coral rubble cut into the slope of the hill. In addition to the communication trench, the platform is also served by a rudimentary ramp sloping down into the flatter base of the shoulder crest. There is little clear reason for the presence of the gently sloping ramp feature other than to facilitate movement to the platform by a heavy, wheeled piece of equipment. It is on the strength of this reasoning and the viewshed that the platform has been interpreted as an IJ field artillery position. The field of fire from the platform towards the south-west would have been excellent and an artillery piece located here could have operated alongside the 75mm field gun positioned at AB14-051 (c.70m to the north-west) to provide a heavy cross fire to a hostile force advancing up the shoulder between Hill Row #1 and #2. The communication trench is well-constructed with high, coral rubble revetment walls lining either side. The size may have allowed an artillery piece to be drawn back and concealed near or in cave A when not in use.

Figure 127 - AB14-076: communication trench leading to coral platform A

The lower single chambered cave at A is generally sub-circular in plan (4.39x3.96x2.45m [LxWxH]) with natural, uneven floor, walls and ceiling and a single firing port embrasure cut through the west wall facing west-north-west. A 3.22m long shaft links this first, lower cave with the second, uppermost cave which is also of a single chambered natural type (Figure 128). Sub-rectangular in plan, the large chamber (6.18x3.30m) was filled with loose rubble which likely originated from the ceiling which has partially collapsed exposing the artifact devoid interior to the elements. The third cave (B) is situated higher up the slope of Hill Row #2 than the others and c.12m to the north-east. The entrance faces north-west and is reinforced with a coral rubble revetment wall on the north-eastern side (Figure 128). This is also a fairly natural, single chambered example of sub-rectangular plan (8.56x6.74x3.49m [LxWxH]) with rough, irregular walls, floor and ceiling.

A lack of artifacts across the complex of caves and field fortification features has made it difficult to assess the precise function of the individual elements of the site. The flat coral platform (C) would accommodate an IJ artillery piece but no ordnance or associated artillery equipment has been identified to substantiate this theory. The embrasure in lower cave A

may have been intended to provide observation and/or fire support covering the approaches to the west or south-west with the caves being used as shelters and stores for IJ troops defending the shoulder between Hill Row #1 and #2. Broadly speaking, AB14-076 therefore conforms to the definition of an IJ strongpoint with its close grouping of mutually supporting positions, that may have included artillery, located on defensively advantageous high ground (Rottman 2005: 19). This is by far the most obviously integrated series of IJ defensive features encountered in Area B during the survey and provides an excellent example of a well prepared position which demonstrates the inventive use and augmentation of natural features by the Imperial Japanese to create a defense system that blended into the natural landscape.

Figure 128 - AB14-076: Upper and Lower Cave A (left), and Cave B (right)

Artifacts Noted:
Lower Cave A: IJ mess kit tray/lid **Upper Cave A:** shrapnel fragments **Base of ramp near C:** x2 metal storage drums (may have formed part of a revetment barricade)

AB14-077 US Defensive Fighting Positions

As dusk fell on 26th September, Sergeant Walter 'Flip' Afflito, *Baker* Company, 1st Bn, 5th Marine Regt found himself on the summit of Hill Row #2 and in command of a depleted force of 40 men (the survivors of two platoons that had suffered 48% casualties since landing on

Peleliu 16 days earlier) (Hallas 1994: 190). This situation not only highlights the ferocity of the fighting but also the high attrition rate of front line infantry commissioned officers (COs). Afflito had personally witnessed the loss of two replacement officers commanding his platoon (one from a mortar platoon, the other an inexperienced engineer) in that one day of fighting for Hill Row alone. Now he had - like many non-commissioned officers (NCOs) would have before the battle was over - the responsibility for the training, discipline, control and tactical employment of entire platoons: over three times as many men as they were trained to lead (War Dept. 1944b: 136 & 165). Atop Hill Row #2, PAS'14 located eight defensive fighting positions which could have accommodated roughly a third of Afflito's men (sites suffixed A-H).

The eight defensive fighting positions identified in the survey form a rough perimeter around the 'military crest' upper elevations of Hill Row #2 with the majority of positions (A-D & G) concentrated on the north-western side of the hill facing Hill Row #1. Hough (1950) describes how supporting flank fire from Hill Row #2 was used to aid the beleaguered *Charlie* Company as they battled their way up onto Hill Row #1 and to cover their later withdrawal (*ibid.*: 119). Looking at the form and disposition of the AB14-077 sites, it is clear that as much automatic fire as possible was positioned on the north-western side of the hill for this purpose. Sites A-D & G are all of a similar large size (c.2.50x2m [LxW]), sub-rectangular in plan with a square shelf positioned centrally against the front face. They all make use of natural depressions and outcrops to enhance their cover and concealment and are situated just off the summit so as to avoid being silhouetted against the skyline. All are far more elaborately constructed than any other US defensive fighting positions recorded on Peleliu to date with carefully formed coral rubble parapet walls rising to an extensive average height of 0.80m.

The morphology of these positions closely resembles the layout of the Caliber .30 Machine Gun (Light) Horseshoe type infantry weapon emplacement detailed in the US Army's Engineer Field Manual (FM) 5-15 used by both the Army and Marine Corps in WWII (War Dept. 1944a: 57-60) (Figure 129). The central, front shelf evident at all five of these sites would have served as a gun platform for the .30 cal Browning M1919A4 air-cooled light machine guns of *Baker* Company's machine gun platoon. With five machine guns emplaced along this edge of the hill, the fire that could be poured on Hill Row #1 would have been considerable, representing nearly the full complement of *Baker's* six available machine guns

(Moran and Rottman 2002: 32). Site D is the only position in this group to contain artifacts, a water canteen and an undetonated US Mk2 hand grenade, each telling their own story of the relentless heat and constant threat of attack by night time infiltration (Figure 130).

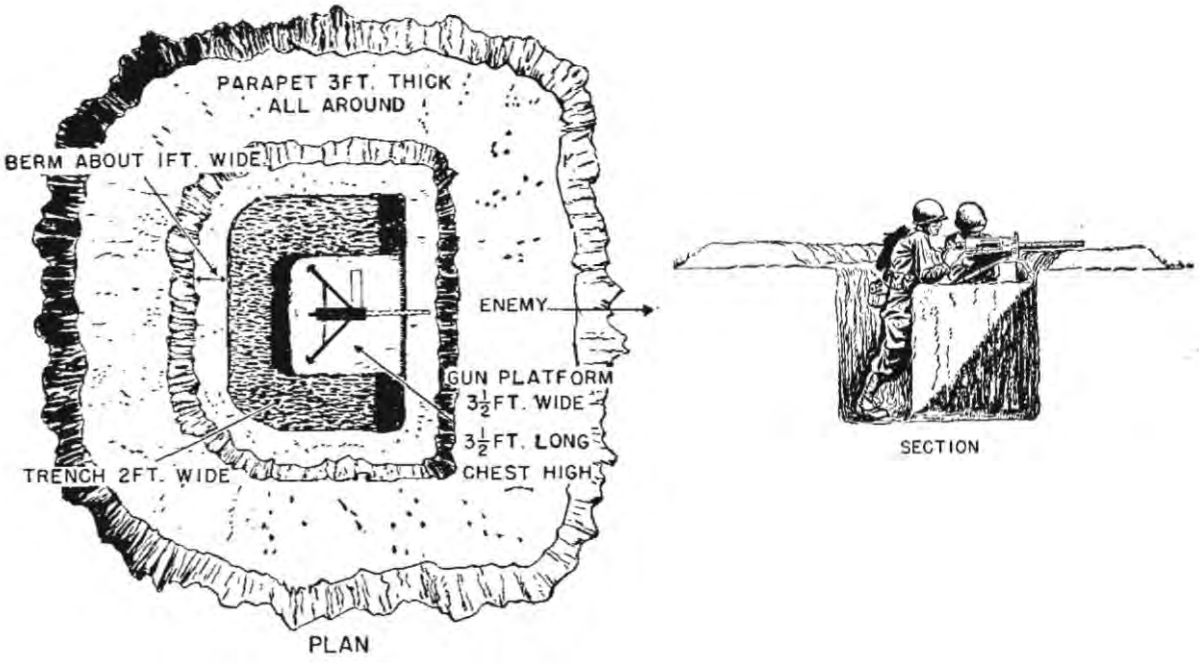


Figure 129 - The Caliber .30 Machine Gun (Light) Horseshoe type infantry weapon emplacement (War Dept. 1944a: 59)

Figure 130 - AB14-077D: horseshoe type LMG emplacement with detail of US canteen

Site AB14-077E is a rectangular depression (2.41x1.71x0.85m [LxWxH]) surrounded on all sides by a coral rubble parapet with an entrance break in the south-western (rear) corner. This defensive fighting position is more akin to the two person skirmisher trenches that have been found on the South 100 Escarpment (AB14-092) and elsewhere in Hill Row (AB14-063); as such, it likely served as a rifleman's position. The position was well preserved and an entrenching tool mattock head was found within it. AB14-077E faces north across a steep cleft in the hillside towards the rear (eastern) site of the summit. On the opposite side of this cleft is AB14-077F: an L-shaped, south-east facing skirmisher trench of similar coral rubble construction (5.12x3.13m [LxW]). This pair of rifle positions would appear to have been sited to cover the cleft at the rear of the platoon defense area, perhaps as a protective measure against infiltration from the east Hill Row #3 and the Chemiangel ridge which would still have been in enemy hands on the 26th September.

Site AB14-077H is a far more ephemeral 2m long parapet of coral rubble rocks set perpendicular to a small, vertical rock face near the summit of Hill Row #2. A series of other depressions and coral rock arrangements are visible in this area but all proved difficult to define into distinct forms. Although difficult to discern in the field owing to the inherent challenges of orientation in the jungle, analysis of site locations in GIS indicates that AB14-077H is quite centrally located within the platoon defense area and in relation to the main line of resistance (MLR) formed by sites A-D & G. It is possible that this site may therefore have served as a platoon command post (CP) accommodating the men of the platoon command group such as Sgt. Afflito.

Just like the South 100 Escarpment in Area A, the completeness and quality of preservation of the platoon defense area positions on Hill Row #2 is truly remarkable. The site types are far more elaborate, and construction quality is far superior to any other defensive fighting positions thus far recorded on Peleliu making AB14-077 a very important and exceptionally well preserved part of the battlefield. In his account to Hallas, Afflito describes how his second CO of the 26th September was a lieutenant from an engineer battalion who was wounded and evacuated whilst on Hill Row #2 (Hallas 1995: 190). It is interesting to consider that, although the officer was held in low regard by Afflito for his inexperience of running a platoon (*ibid.*), the quality and conformity of sites A-D & G to the horseshoe type infantry

weapon emplacement defined in the engineer field manual may be a result of his influence and familiarity with the intricacies of field fortification construction.

AB14-078 Improved Natural Cave

This cave lies c.14m south of IJ Strongpoint AB14-076, approximately halfway up the hillside and almost immediately below US defensive fighting positions AB14-077a and AB14-077b on the summit of Hill Row #2. The proximity and relative locations of the US and IJ positions along Hill Row really emphasize a point made by Hallas (1995:191) that the Marines were all too aware of the fact that although they held the tops of the hills, IJ forces continued to resist from literally under their feet. This particular cave has a single, north-west facing entrance (1.50x1.32m [HxW]) which has been cut out from underneath an overhanging rock shelf accessed via a roughly flat ledge (10x5m [LxW]) (Figure 131). The interior is roughly circular in plan (3.73x5.21m [LxW]) with a slight elongation forming a possible niche at the southern end. This niche is filled with loose rubble and may represent a blocked passage leading into another chamber. An inspection of small holes and voids in the rock face to the north-east of the main entrance suggest that larger cavities exist in this direction which may have once linked up with the main chamber via the blocked passage.

No artifacts were found in or around the site, much like the caves at AB14-076. The flat ledge by the entrance may have served as a firing position for a machine gun or mortar, however, this interpretation is conjectural. Given its close proximity to AB14-076, this cave may have served as a forward observation post for the IJ Strongpoint.

Figure 131 - AB14-078: cave entrance showing flat ledge and voids to the north-east

AB14-086 IJ Improvised Defensive Fighting Position

Following a further 24 hours of bitter fighting for the top and inside of Hill Row #1, the 1st Bn, 5th Marine Regt turned their attention to extending their lines further east along Hill Row towards the looming mass of Radar Hill. On the morning of 28th September (D+13), *Baker* Company advanced on Hill Row #3 from their positions on Hill Row #2 with demolitions and bazooka teams from the HQ Company and *Able* Company riflemen supporting along the Hill Row east-west road (Hough 1950: 126). Crossing the shoulder that connects the two hills, *Baker* ran into well entrenched opposition and only succeeded in breaking through to the summit following the arrival of the sole surviving bulldozer tank (M4 Sherman tank fitted with a bulldozer blade) of the 1st Tank Bn which had to be backed into a depression to enable its 75mm gun to be elevated high enough to fire on the IJ positions on the hill side (*ibid.*) (Figure 132). With this much needed fire support, the men of *Baker* Company succeeded in taking the top by 1600.

Positioned at over 26m elevation, this site was likely one of the hard to hit IJ positions encountered by *Baker* Company during the assault. It consists of a hastily erected coral rubble parapet (1.17m wide) running along the outer edge of a north-west to south-west aligned ledge on the side of Hill Row #3. The parapet extends for c.8.78m in length and includes natural coralline limestone outcrops. It undulates in height quite deliberately from c.0.60m-c.1.10m which creates a crenelated appearance offering a variety of concealment and firing opportunities along its length in a west-south-west direction. Between the parapet and the vertical cliff face behind it, a 1.80m wide flat ledge exists enabling concealed movement along the full extent of the position. The site most closely resembles a standard fire trench field fortification and, although no finds were found in associated with this site, it likely served as an improvised fighting position for IJ forces defending Hill Row #3.

AB14-087 Natural Cave Rock Shelter

Situated under a Banyan tree on the lower western slope of Hill Row #3, this south-west facing semi-circular recess (3.3x2.15x1.87m [WxHxD]) in the hillside exhibits extensive rockfall in and around it. It is unclear whether this collapse has been caused by natural erosive processes or large caliber gun fire. Like so many of this type, the shelter appears to be entirely natural in form and, although no artifacts were found, its use as an improvised fighting position cannot be ruled out.

Figure 132 - M4 Sherman Bulldozer Tank C14: firing on what could be site AB14-061 (Hill Row #1) using a ditch to increase the main gun elevation. The disabled 75mm Type 95 field gun outside cave site AB14-058 is clearly visible to the left of the Sherman.

AB14-088 Natural Cave Rock Shelter

Approximately 10m north-east of AB14-087 is a second natural rock shelter also facing south-west. It is narrower but deeper (1x3x3m [WxHxD]) and similarly lacks evidence of human

activity. Like 087, this site may also have been used as an improvised fighting position by a single combatant operating in this area.

AB14-089 Natural Cave Rock Shelter

This site is the third natural rock shelter situated along the lower south-west slope of Hill Row #3 with a south-west facing entrance. Roughly A-shaped in section, this small recess in the hill side (2x2x2.83m) displays evidence of sustaining impacts from large caliber ordnance. Rubble spread and jagged fractures around the entrance suggest that the cave mouth was originally 1x1m in size and that the opening has been enlarged through gun fire. No evidence of occupation was evident; however, damage to the site would suggest that it was suspected by US forces as a hostile position.

AB14-090 Natural Cave Rock Shelter

Situated on the lower shoulder between Hill Row #2 and #3, this small, semi-circular natural recess in the hill side (3.50x2x1.50m [WxHxD]) faces south towards the Hill Row road. Four fragments of shrapnel in the east corner and the twisted metal casing of a detonated 105mm projectile c.4m to the west of the site indicate that this rock shelter received a large caliber bombardment. Considerable loose coral rubble around the site may indicate that the shelter may have been bigger and has been partially destroyed by the bombardment it received. Although no artifactual evidence of occupation was found, the site may have been used as an improvised defensive fighting position by IJ personnel defending Hill Row #2.

AB14-SF065 US Water Canteen Inscribed 'CORBI'

This artifact proved an unexpected discovery for the UoA team whilst surveying the lower slopes of Hill Row #3. Lying inverted and partially buried in the jungle floor was a largely intact and excellently preserved US canteen and attached metal drinking cup. On closer inspection, the cap and retaining chain were also found to be intact but most interestingly the base of the metal cup was found to be inscribed in large letters - 'CORBI' (Figure 133). A photographic record and GPS coordinates were taken of the canteen before leaving it in situ. No damage to the canteen was found and the orientation would suggests that it was dropped, perhaps accidentally, by its owner under circumstances that did not allow its loss to be noticed until sometime later by which point the loss location proved too difficult to return to. Following the survey, Raffield carried out online research with the aim of identifying

whether the inscription in the canteen base was the name. This initial, speculative work brought up an obituary for an Eliadoro T. Corbi (1920-2011) who had been a member of the 1st Marine Division during WWII. The obituary states that Corbi had been raised in the Bronx area, New York State, USA and had enlisted in the US Marine Corps where he saw extensive action in the Pacific (Hudson Valley Funeral Homes 2015). While the obituary stated that he served and was wounded at Guadalcanal, no references was made to Peleliu. Further searching of the internet revealed a copy of the Marine Corps Chevron magazine dated 16th October 1943, in which an Eli T. Corbi was featured in an article which noted that he had played football together for the Bronx Spartans and served at Guadalcanal (Lewis 1943: 13). This information solidified the connection between Eliadoro and 'Eli' Corbi.

Figure 133 - AB14-SF065: US water canteen inscribed 'CORBI'

A further piece of evidence came to light through the citation for a donation made to the 1st Marine Division Association Scholarship Fund by a PFC Michael Bernardo, who had served in B Company, 1st Bn, 5th Marine Regt during WWII. Two donations, recorded in copies of The Old Breed News, were made by Bernardo in memory of a number of Marines from "B-1-5 WWII" among which "Eli Corbi" was listed by name on both occasions (1st Marine Division Association 2009: 24 and 2014: 23). The association of Eli Corbi with B Company, 1st Bn, 5th Marine Regt was sufficient to tentatively link Eliadoro T. Corbi with the canteen which was

located along the line of advance that *Baker* Company would have taken during its assault on Hill Row #3 on 28th September.

With this relatively strong circumstantial evidence, an effort was made by Knecht to contact Eliadoro Corbi's family. A connection was made by telephone as well as by email and the family quickly confirmed that Corbi had indeed served on Peleliu with the 1st Marine Division. The family also provided photographs of Corbi as well as a link to a published photograph depicting Eli Corbi (easily distinguishable by his bandaged leg) taking part in an amphibious patrol of the Natamo River near Cape Gloucester (Figure 134).

Figure 134 - Eliadoro T. Corbi (facing camera) on a reconnaissance of the Natamo River, New Britain, 1944 (McMillan 1944: 218)

In light of the evidence uncovered, it is the conclusion of the authors that canteen AB14-SF065 once belonged to Eliadoro T. Corbi of *Baker* Company, 1st Bn, 5th Marine Regt and was lost by him whilst moving between Hill Row #2 and #3 most likely on the 28th September 1944. This scale of contextual and biographical detail allows this immaculately preserved artifact to offer a uniquely 'human' and personal insight into the conflict that took place among the ridges of Hill Row during the last days of September 1944.

AB14-SF066 US 60mm Cloverleaf '18 to Bundle' Ammunition Container Lids

Metal ammunition container lids similar to these examples were noted in large heaps in the CCZ during the 2010 field survey; however, they have been far scarcer in the northern part of Peleliu in 2014. This particular pair of cloverleaf container lids (Figure 135) were found on the lower slopes of the shoulder between Hill Row #2 and #3. They are of the largest type of

cloverleaf produced with each of the three 'leaves' c.150mm in diameter. The two metal lids would have been fastened together at either end of a bundle of three fiber containers by a metal rod which ran down the center between the fiber containers and secured at either end by a wing nut. The size of the lids makes them distinctive as originating from a 60mm mortar bomb '18 to bundle' cloverleaf ammunition container bundle. Each of the three fiber containers would have held six smaller fiber tubes inside, each of which would have contained a 60mm M49A2 HE mortar bomb (Figure 135). Historic photographs of emplaced 60mm M2 mortars portray the various components of these bundles strewn around the edges of the position as they were disassembled and the bombs either fired directly or piled ready for firing (Figure 136). When advancing, it is presumed that once such a large bundle was delivered it would be unpacked and the smallest tubes containing the mortar bombs repacked into the ammunition bags of the mortar section's ammunition carriers.

Figure 135 - AB14-SF066: 60mm mortar bomb '18 to bundle' cloverleaf ammunition containers

These two cloverleaf bundle lids, located as they are in open ground near the Hill Row road, are perhaps the remains of this kind of activity taking place. As *Baker* Company, 1st Bn, 5th Marine Regt advanced across the shoulder to engage the IJ forces on Hill Row #3, the mortar section would have moved forward in support of the leading rifle platoons (War Dept. 1944b: 23). As the Company came up against entrenched positions and the advance bogged down, the mortar section would have begun expending more of its ammunition and would have required resupply from a central ammunition dump. The discarded lids at this site may

suggest that a bundle was delivered to a mortar section positioned here who may have repacked their new stock of ammunition into their carriers before moving forward again.

Figure 136 - 60mm cloverleaf bundles packed as delivered (above) and unpacked for use (below)

3.1.2 Chemiangel Mountains

PAS'14 Site #	Site Description
AB14-065	Natural Cave - freshwater lake
AB14-066	Standing Building - small, concrete single room structure
AB14-067	Possible Defensive Fighting Position - rock-cut, partially destroyed
AB14-068	Improved Natural Cave (balcony-type)
AB14-069	IJ Defensive Fighting Position - rock-cut with coral rubble parapet
AB14-070	IJ Defensive Fighting Position - rock-cut
AB14-071A	Artificial Cave (Army J-type) - entrance
AB14-071B	Improved Natural Cave Rock Shelter - sniper position with loop hole
AB14-072	Concrete Foundations - related to phosphate mining activity
AB14-079A	Bomb Crater
AB14-079B	Bomb Crater
AB14-080	Defensive Fighting Position - crescent coral rifle pit
AB14-081	IJ Observation Post - rectangular coral position
AB14-082	US Defensive Fighting Position - semi-circular coral skirmisher trench
AB14-083A	Defensive Fighting Position - coral outcrop semi-circular trench
AB14-083B	Defensive Fighting Position - square coral rifle pit
AB14-084	Defensive Fighting Position - crescent coral rifle pit
AB14-085	IJ Observation Post - partially rock-cut

Pre-Battle Sites

During the 2014 survey of the Chemiangel Mountain region of northern Peleliu, several sites were recorded that likely pre-date the US invasion on 15th September 1944. As was the case with Area A, these sites are described under a separate sub-headed section.

AB14-066 Standing Building

AB14-066 is located on the southern slope of the northernmost peak on the Chemiangel ridge; it consists of a small, single floor structure aligned east to west which is rectangular in

plan with a pitched roof (2.44x1.84x1.72m [LxWxH]). The thin walls are constructed from cast reinforced concrete with a doorway opening in the west gable end wall (Figure 137). None of the roof survives suggesting that it may have been made from biodegradable organic materials such as wooden beams with a thatch covering. Ventilation holes (c.20m wide) are present at the base of each wall. The whole structure has been constructed on a thin concrete foundation base which has been cast onto a levelled ledge on the sloping hillside. The south (downslope) elevation is in poor condition having slumped and partially collapsed outward, posterior to the foundation base. A large, pale blue metal bowl was the only artifact observed inside the structure and was inverted on the floor with the base rusted through. The style and color is reminiscent of smaller IJN rice bowls that have been found in caves during the survey (e.g. AB14-031). The location, architecture and lack of evidence of involvement in the conflict raging across the rest of the island suggests that this building predates the Battle of Peleliu and relates instead to the phosphate mining, drying and loading period of the mid-late 1930's. AB14-066 is located in the hills to the immediate south-east of the phosphate drying plant (2010 survey site AB155) and, as such, is near to where a lot of the phosphate related infrastructure and activity was located (Murray 2006: 113) (Figure 138).

Figure 137 - AB14-066: phosphate period standing building

Figure 138 - Northern Peleliu on 31st March 1944 showing the phosphate drying plant, loading pier and associated infrastructure

AB14-072 Concrete Foundations

A pair of concrete building foundation bases are visible eroding out of the north-west slope near the northern tip of the Chemiangel ridge. Only the corner of one base and the side of the second are visible where they emerge through the thinning soil (Figure 139). The limited visibility made it impossible to estimate the dimensions of the buildings that once stood here but they were likely of a moderate size. Both bases are positioned almost directly upslope and slightly north of the phosphate loading pier recorded in 2010 as site AB153. Analysis of historic aerial photographs taken during the aerial bombardment of Peleliu in July 1944 show two single story buildings of Japanese architectural style in this vicinity and it is likely that these structures stood on the foundations identified at site AB14-072 (Figure 140). Comparison with Figure 138 reveal additional points of interest in these photos including the construction of the causeway to Ngedebus between the end of March and July. The phosphate drying plant had also been demolished by July and significant fans of excavated material are visible outside the southernmost entrance 10 into cave complex AB154 (otherwise known as 1000 man cave) indicating that major construction of this site was in progress.

Figure 139 - AB14-072: concrete foundations bases eroding out of hillside

Figure 140 - Northern Peleliu on 25th July 1944 showing demolished phosphate drying plant, loading pier and AB14-072 buildings on slope above

AB14-079A Bomb Crater

The first of two circular, crater-like depressions located on the shoulder between Hill Row #2 and the Chemiangel ridge. This smaller example (c.3.69m diameter x c.1m depth) appears to cut through the bedrock with rock visible in the base. It is most likely a bomb crater formed during the pre-invasion raids on identified targets such as the IJ northern radio station 500m to the east.

AB14-079B Bomb Crater

The second of two craters on the shoulder between Hill Row #2 and the Chemiangel ridge. This example is 3m south of 079A, 1.75m deep and a slightly larger diameter. Like 079A, this feature is also likely a bomb crater formed during the pre-invasion raids. The larger size may not necessarily reflect a different weight of explosive but could be a result of the ground being softer here. It is therefore possible that the two bombs could have been released from the same aircraft.

The Battle for the Chemiangel Mountains

As dawn broke on 27th September (D+12) the 1st Bn of the 5th Marine Regt readied itself for a second day tackling Hill Row, the 3rd Bn prepared for their shore-to-shore assault on Ngedebus and Major Gayle's 2nd Bn awoke in their small battalion defense area to exceptionally accurate mortar fire. This was the beginning of a challenging day for the 2nd Bn as their advance to the northern tip of Peleliu (begun late in the previous day) continued to be thwarted by a wide and deep anti-tank ditch that cut across a natural narrowing point between the shore and the Chemiangel heights (Gayle 1996: 30). This obstacle was covered by automatic fire originating from the foundation base of the phosphate drying plant (2010 site AB155) which had since been converted into a multi-embrasure blockhouse (Garand and Strowbridge 1971: 208). With the ditch obstacle preventing armored vehicle support and the infantry pinned down by the intensive fire from AB155, it fell to the crew of M4 Sherman Bulldozer Tank C14 to sufficiently backfill the ditch for an LVT flamethrower to cross before any kind of advance could recommence (*ibid.*). Whilst the northern drive along the low ground was stymied, a 155mm artillery piece had been brought forward and steadily began bombarding visible caves in the western side of the Chemiangel ridge from point blank range (Gayle 1996: 31). The bombardment was followed up by *Easy* Company, 2nd Bn, 5th Marine

Regt who climbed the steep eastern face of the Chemiangel and began a steady push north-eastwards along the top of the ridge (Hough 1950: 121).

AB14-065 Natural Cave - Freshwater Lake

The site, known colloquially as 'North Lake Cave', is situated at the foot of the western side of the Chemiangel Mountains. It is a large, naturally cavernous geological formation (22.96x 10.87x2.83m [LxWxH]) that contains an expansive pool of freshwater that takes on an oval shape along the interior basin and walls of the natural cave interior. A large (2.28x3.74m [HxW]) west facing mouth provides access into a vast single chamber where the floor gently slopes down to the water's edge (Figure 141). The floor material consists of rubble earth and coral rock fragments that may be contiguous into the inner cavity. Based on examinations from field survey it appears to be a natural feature with no indications of modifications or refinements. A large opening in the cave ceiling exists above the center of the water pool and may provide the primary ingress point for fresh rain water into the pool. Although not made reference to in consulted IJ accounts, it is certain that if the cave held fresh water in the 1940s that it would have been an important source of drinking water for locally garrisoned troops.

Artifacts Noted:
small metal bowl • turtle shell • *no other artifacts were noted on the surface in this location

Figure 141 - AB14-065: Natural fresh water lake cave exterior and interior

AB14-067 Possible Defensive Fighting Position

A very ephemeral feature on the southern face of the northernmost peak of the Chemiangel ridge was noted as the possible remains of an eroded or partially destroyed defensive fighting position. The site constitutes a small, man-made, sub-rectangular, levelled area (1x0.5m) cut into the side of the sloping south face of the hill. No artifactual evidence or evidence of conflict was found in association with the site; however, the morphology of the feature was considered similar enough to more substantial examples of defensive fighting positions to warrant recording as such.

AB14-068 Improved Natural Cave - Balcony-Type

This labyrinth of a cave fits Phelan's definitions of the improved, natural balcony-type cave (Phelan 1945: 27-28). It is located in the upper core of the northernmost peak of the central Chemiangel ridge making it particularly inaccessible which was a key defensive feature of this type and extends right the way though the hill from east to west. It has multiple entrances and openings onto three sides of the hill (east, west and south) enabling a multitude of concealed engagement and evasion opportunities for the occupants. A total of four ingress/egress points were located and recorded, three of which (exiting to the west side of the hill) were blocked to varying degrees. Access was afforded by the southern entrance, the only safe and fully unblocked means of entry, which is a small A-shaped opening (1.66x1.58m [HxW]) in the vertical cliff face leading from a narrow ledge with precipitous drops on two sides. The ledge could only be reached by means of a safety rope line erected by the CGD team. The interior is complex and best described illustratively through Figure 142. The cave system consists of four distinct zones (Figure 144) that are interconnected by narrower passageways that generally include a drop down in elevation either through a deliberate step in the floor or a graduated slope. Zone #1 (numbered from the southern entrance) is by far the largest and least improved, and likely represents the original natural fault cavity that was exploited and augmented to form the cave complex. It consists of a long, narrow and relatively tall (10.57x2.24x2.27m) natural cavity or gallery with a large opening in the north-east side providing an exceptional observation and firing position across a wide arc from the north-east to the south-west. The construction of the deeper interior zones and connecting passageways display the niche, smoothly hewn walls and ceiling architecture that is consistent with IJN building methods. Given the quality and complexity of the construction it is highly likely that this cave is the work of the IJN 214th Naval Construction Bn.

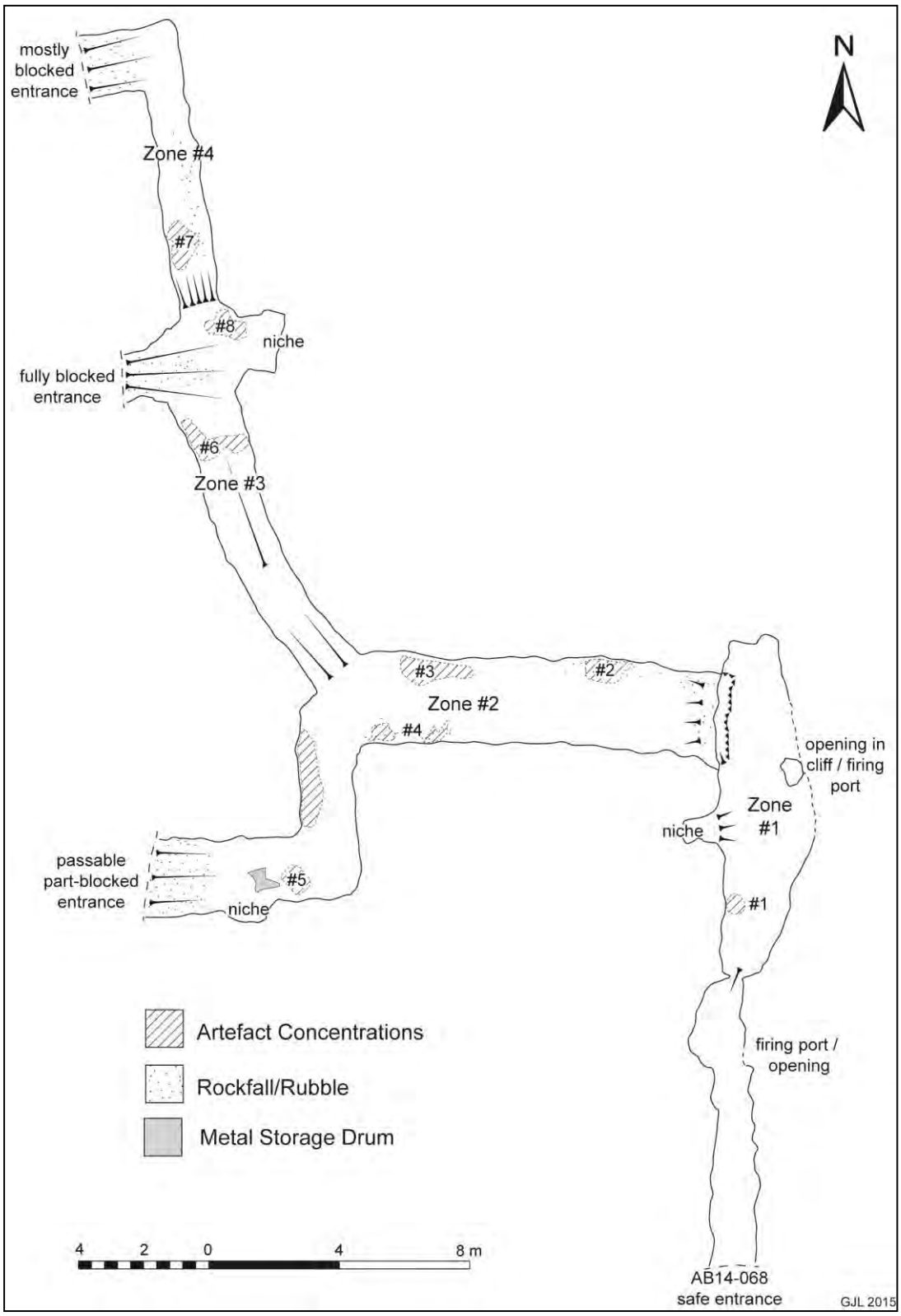


Figure 142 - AB14-068: cave interior floor plan

Although there is some evidence of artifact movement within the cave, there remains an incredible quantity of artifactual material throughout the interior, all of which provides a fascinating insight into the site biography. Discarded chisels in the lower depths of Zone #3 (assemblage #8) suggest the cave was still undergoing enhancements when the battle began;

substantial wooden planks in Zone #2 and nails driven into the walls indicate interior furnishings or cladding was once present. A large number of twisted and often shrapnel perforated canteens and mess kits as well as other personal equipment such as leather ammunition pouches, straps and combat boot fragments throughout Zones #2-4 indicate a large number of individuals once lived in the deeper areas of the cave. Fragments of disarticulated human remains remind that life was also lost in these places. A very large number of glass bottles were noted throughout the site; this included the fairly ubiquitous aqua-blue and amber sake-types in varying condition but also a high number of the smaller, short necked, pint sized aqua-blue and amber glass bottles were present, particularly in assemblage #2 and #7. These bottle types are commonly referred to as medical bottles and are associated with IJ first aid kits for storing various drugs and medicines (Figure 143). Three cans of individual decontaminant were also identified amidst the medical bottle assemblage. Issued singly to personnel, the decontaminant was intended for use in neutralizing liquid blister gas (War Dept. 1944c: 263). Finding such a collection of decontaminant in one place and alongside the medical bottles (Figure 145) suggests that the administering of medical aid was being organized with supplies gathered from individually carried kits and cached together in one place. The quantities of discarded personal equipment and these bottles raises the interesting possibility that this cave, or certainly sections of it, was being used as an improvised aid station for treating wounded IJ personnel.

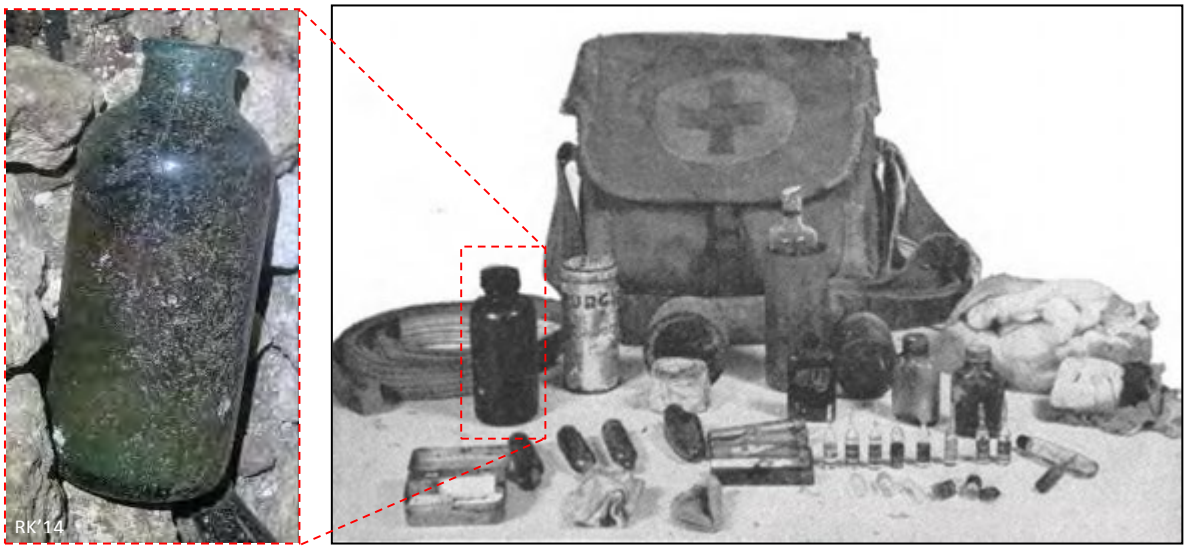


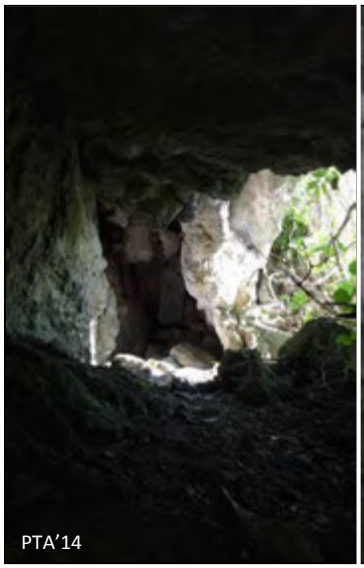
Figure 143 - IJ first aid kit showing detail of small medical bottles (War Dept. 1944c: 346)

Personal hygiene items such as a soap dish (commonly associated with IJ Officers), fragments of yellowed plastic ranging ruler and a broad variety of weaponry accoutrement (6.5mm ammunition, hand grenades and 7.7mm Type 92 'Hotchkiss-type' HMG strip clip fragments)

all indicate that this site housed a mixed, likely very active and transient military community. The interrogation report of IJA Corporal Ko Takahashi, 6th Company, 2nd Bn, 2nd Infantry Regt testifies to the diverse composition of the cave garrisons describing how the survivors of his Army unit shared a cave with a Navy detachment for 15 days before he moved on (NARA 11/10/1944: 1). In a later interview, Takahashi offers a unique insight into the composition, deployment, fire and maneuver tactics employed at platoon and company level by the 2nd Infantry Regt on Peleliu. The primary role of caves as places of rest and shelter for combat personnel not engaged in offensive operations is emphasized; it is also stated that troops would be regularly rotated, particularly during the hours of darkness, between the front lines and the caves (NARA 15/10/1944: 1). The mix of material that survives today in AB14-068' assemblages offers evidence of this fluid rotation of personnel during the battle.

Section #2: looking north

Section #2: looking east



Section #1: looking north

Section #3: looking north-west

Section #4: looking south-east

Figure 144 - AB14-068: the four interior sections of the cave

Figure 145 - AB14-068: detail of assemblage #7 with feature schematic showing decontaminant cans

As well as insights into how the cave functioned, evidence also exists as to how it ceased to operate. An expended US .30 cal cartridge and an empty US M1A1 'Thompson' sub-machine gun magazine on the floor at the southern end of Section 1 indicate that the gallery was entered from the south by US combat personnel and that shots were fired. Given the relative inaccessibility of the southern entrance, it is likely that this incursion took place following the closure of the other, larger entrances in the western side of the hill. Considerable alluvial fans of mixed rubble spreads down from the two, small, fully blocked entrances suggesting that sizeable explosive charges were used to seal them. Hallas (1995) quotes the 2nd Bn, 5th Marine Regt Operations Officer's description of the efforts taken by *Easy* and *Fox* Company to clear caves on the Chemiangel ridge: "*It was hard to believe that a 70-pound compo charge wrapped around an 81mm mortar shell, which when set off, fairly rocked the OP on top of the hill, did not kill the Nips in the caves*" (*ibid.*: 192). In addition to being 80% blocked, the largest entrance (opening into Section 2) also contains fragments of 75mm projectile which may have originated from US projectiles fired from armor or artillery located at the base of the hill.

Artifacts Noted (by assemblage #):
#1: US M1A1 'Thompson' sub-machine gun magazine • expended US .30 cal cartridge **#2:** IJA gas mask anti-fog discs • Unfired IJ 6.5mm ammunition in 5 round clips and loose • IJ bayonet fragment • IJ mess kits • IJ canteens • sake-type bottles • small clear glass bottle • wooden plank fragments **#3:** IJ canteen with bullet holes • fragments of shoe leather • perforated rectangular metal container **#4:** wooden plank fragments • IJ canteen • crumpled metal storage drum • amber glass sake-type bottles **#5:** wooden plank fragments • metal mining chisel • metal storage drum • IJ canteen • IJ leather ammunition pouch fragments • 75mm projectile fragments **#6:** disarticulated human remains • leather combat boot fragments • ranging ruler fragments • wood fragments • leather belt strap • IJ mess kit lid • broken glass bottle shards • IJ metal storage container • small rice bowl **#7:** aqua-blue & amber glass medical bottles • various sake-type bottles • IJ leather ammunition pouch fragments • metal angle clamps • IJ mess kit components • IJ canteen • undetonated, badly corroded IJ Type 91 and 99 hand grenades • IJ gas mask tissot tube fragment • IJ individual decontaminant cans **#8:** long metal chisel • amber glass sake-type bottles • soap dish **Other isolated artifacts:** IJ porcelain shards • metal rice bowls & cutlery• batteries • empty 7.7mm HMG strip clip • IJ canteens & mess kits • wooden plank fragments

AB14-069 IJ Defensive Fighting Position

Cut into a coral rock outcrop near the summit of the northernmost peak in the Chemiangel Mountains, AB14-069 is also positioned directly above cave AB14-068. It is a moderately sized, sub-circular feature in plan (2.88x2.70m internal, 3.60x3.60m external [LxW]) with a short, narrow entrance passage (c.1x0.76m) on the west side. A single course of large

coralline limestone boulders have been used to construct a low parapet on the eastern side where the ground falls away dramatically into the steep eastern face of the hill (Figure 146). Clear views are afforded in this direction which would undoubtedly also be the primary field of fire. The north and western sides of the feature have been excavated out of the hillside to create the level base of the site interior and form walls 0.94m high in places. Several indeterminate metal rails were the sole cultural artifacts found within the site perimeter offering little assistance to site characterization. Although it is known that *Easy* Company, 2nd Bn, 5th Marine Regt established observation posts along the Chemiangel ridge (*ibid.*), it is felt that the close proximity to AB14-068 and the permanence of the rock cut construction would suggest an IJ origin rather than US. Use by US forces later in the battle cannot, however, be ruled out. The site likely served as an observation post or possibly a fighting position for a mortar team operating from the cave below.

Figure 146 - AB14-069: Bello assisting with the recording of the defensive fighting position

AB14-070 IJ Defensive Fighting Position

This site is located due north and up slope from AB14-069. Similarly to the previous site, this feature is sub-circular in plan but larger (4.80x3.60m internal, 6.20x5.30m external [LxW]) with a west facing, short and narrow entrance passage (0.98m) and broad views to the east. Unlike AB14-069, this site appears to be entirely cut from the outcropping rock near the

summit of the hill. The internal wall faces are vertical and stand to 1.18m in height indicating quite an extensive and careful excavation of the hillside has taken place to form the flat based enclosure (Figure 147). Cultural remains in and around the site proved undiagnostic for determining IJ or US origin. Metal hooks, stakes, rails, anchors, a circular spring with metal eyelet, a metal carry rack with 4 handles (possibly forming some kind of cradle), a small can lid, glass shards, communications wire and a trapezoidal stone block that may have been some sort of weight (15x20cm [HxW]) were identified either in or around the parapet of the site.

Like AB14-069, the rock cut nature of the site and its close proximity to cave AB14-068 suggest that this was primarily constructed and used by IJ forces operating in this area either as an observation post or some sort of weapons platform. The site could equally have been reused in a similar capacity by US forces once the ridge top was captured.

Figure 147 - AB14-070: interior view looking east showing rock cut parapet and flat base

AB14-071A Artificial Cave - Army J-Type

Located 20m south and downslope from AB14-068, this cave is one of the rarer J-Type classifications. It features a single, regular, rectangular south-south-west facing entrance (2.20x1.35m [WxH]) which opens into a straight, flat based tunnel that gradually slopes upward for c.9.43m before curving to the east-north-east and terminating. The walls and

ceiling have been roughly hewn into a high (1.66m) rectangular profile more akin to IJN construction than IJA but as the tunnel passage begins to curve the profile becomes less consistent and the height reduces to 1.10m. Phelan's discussion of the J-type offers an explanation for the construction changes describing that the J-type was an Army modification of the Navy I-type to provide additional shelter for combat personnel operating crew-served weapons (Phelan 1945: 22). The cave contained a single artifact assemblage located immediately inside the cave and adjacent to the western wall. Amongst the assemblage was a collection of IJA 70mm propellant cases and a fractured IJA 70mm HE projectile (Figure 148). It is unclear from the artifacts present whether an artillery piece (most likely a Type 92 Battalion Gun) that used this ordnance operated close to this site or whether the cave was being used as an ammunition store; however, combined with Phelan's explanation of J-type caves as shelters for weapon crews the former interpretation is the most likely.

Artifacts Noted:
curved metal bar • x2 IJ canteens • Leather/rubber combat boot fragments • distorted IJ mess kit • metal jug (possibly used for storing water) • undetonated IJ 70mm HE projectile (possibly Type 92) • IJ 70mm propellant cases

Figure 148 - AB14-071A: artifact assemblage showing water jug, canteens and 70mm ammunition

AB14-071B Improved Natural Cave Rock Shelter

This rock shelter is situated 4.34m upslope to the north-east of AB14-071A. It is formed from a small, natural crevice (4x1.16x1.70m [LxWxH]) with a south-south-west facing entrance. A small, flat shelf and a firing port have been cut into the eastern wall of the shelter, and, through the embrasure, a broad field of fire from the north to the east is possible. This shelter likely served as a sniper position situated to observe and harass hostile forces approaching the northern shore of Peleliu. If a 70mm Type 92 Battalion Gun was emplaced

on this southern slope near AB14-071 then this position could also have acted as an observation post to direct the high trajectory fire of the howitzer.

AB14-080 Defensive Fighting Position - Crescent

Situated at a high elevation on the southernmost peak of the Chemiangel ridge, this site consists of three well-constructed courses of coral rubble rocks arranged in a crescent (1.63x0.67x0.47m [LxWxH]). The arc of the wall curves out to the west suggesting a field of fire and viewshed covering the widest part of the reef on the west coast of Peleliu. Lack of supporting material culture makes characterization difficult; however, the site morphology conforms to historical photographs of IJ open rifle pits noted elsewhere on Peleliu (Figure 36) and the site is also similar in construction to IJA examples recorded on Walt/Pope Ridge and Hill B during PAS'14. It is therefore considered likely that this was an IJ constructed defensive fighting position but its reuse as part of US defenses once the ridge changed hands cannot be ruled out.

AB14-081 IJ Observation Post - Rectangular

Located on the very summit of the southernmost peak of the Chemiangel ridge, AB14-081 is a moderately sized but very sturdily built, roughly square enclosure (3.47x3.17x0.90m [LxWxH]). It is constructed of coral rubble rocks and a large coralline limestone boulder with a single, wide entrance break (1.30m) located in the south corner. No artifacts were found in association with the site impeding provenance; however, the solid and permanent feel to the construction would suggest an IJ origin. With commanding views in all directions, the strategic importance of this location for observation and visual communication would not have been lost on either side during the battle.

AB14-082 US Defensive Fighting Position

This sub-circular feature is positioned on a slight crest with steep drops on three side (west, north & east) overlooking the shoulder between the southernmost two peaks of the Chemiangel ridge. It conforms to patterns of US skirmisher trench type defensive fighting positions previously identified on Hill Row and the South 100 Escarpment with a single course of crudely arranged coral rocks forming a low parapet around a slight depression (2.73x3.39m). From its vantage point the position has excellent views across the steep slopes to the west, north and east. Approximately 3m south-west of the site, a very well preserved

US combat boot or service shoe was identified partially buried in the thin soil and leaf litter of the jungle floor (Figure 149). From the visible rivet and tread pattern visible on the sole of the boot, it is possible to determine that this was either a US Type III service shoe or combat service boot with a full composition sole and rubber heel. The Type III was the culmination of much research and field testing and became the standard issued to US troops from January 1944 onwards with the full composition sole found to be more hardwearing than other mixed sole arrangements (Reuscher 2014). The boot found near AB14-082 also exhibits two lines of rivets that fasten the quarters to the vamp. This feature was removed from the Type III by the summer of 1944 which places the production and subsequent issue of this example to between January and August 1944. Very little difference exists below the ankle between combat service boots and service shoes (colloquially known as 'Boondockers' by USMC personnel) (*ibid.*) and as a result, the exposed material of the example found does not allow a positive identification between the two types to be made. The Type III service shoe and combat service boot were issued to both the US Army and the USMC (*ibid.*) making it impossible to determine, without surviving labels or stamps, whether this example came from a GI or a Marine; however, the predominance of the 5th Marine Regt in this area during the battle increases the likelihood that this shoe (or boot) came from a member of 2nd Bn, 5th Marine Regt.

Figure 149 - AB14-082: US Type III service shoe/combat service boot with detail of sole tread and heel

AB14-083A Defensive Fighting Position

A pair of small, roughly semi-circular improvised fighting positions (2x1m & 0.5x3m) are situated on the south-western slope of a prominent peak on the Chemiangel ridge. The two features are stepped in elevation and aligned to make use of a mutual linear outcrop of coralline limestone running down the edge of the hill from north-east to south-west. This outcrop forms a natural protective parapet creating a trench-like appearance. The south-eastern sides of the two features are formed by low semi-circular arrangements of coral rubble rocks creating the morphology now becoming familiar with US hasty fortifications on Peleliu. Although no artifactual material was found in association with either of the features, the form suggests that these may have been US constructed defensive fighting positions.

AB14-083B Defensive Fighting Position

On the opposite side of the southern slope to AB14-083A and approximately 20m east, is a well-constructed, roughly square fighting position (1.30x1m). It is formed on three sides by a coral rubble revetment wall standing three courses in height. It backs onto a natural coral outcrop which forms the western side of the position. A small entrance break is present on the north side. Lengths of twisted US one-wire type barbed wire with four-point barbs survive along the front (east) parapet of the position (Figure 150). The site is well constructed and does not comfortably conform to either IJ or US types of hasty field fortifications thus far encountered on Peleliu. The presence of US barbed wire would suggest that the position had been used as part of a defense by US personnel during the battle.

Figure 150 - AB14-083B: defensive fighting position and barbed wire detail

AB14-084 Defensive Fighting Position

A crescent shaped coral rubble revetment wall was recorded just below the summit on the south side of a prominent peak on the Chemiangel ridge. It is well-constructed and stands 3 courses in height facing east-south-east (2.36x1.78x0.67m). Morphologically it appears similar to AB14-005 and AB14-080 suggesting that it may be an IJ constructed open rifle pit; however, no artifactual material was in evidence to substantiate or contradict this interpretation. With impressive views down the southern approaches to the summit, this defensive fighting position is well situated to protect the hill top from assault from the south.

AB14-085 IJ Observation Post

A significant, sub-rectangular cutting (4.52x2.31x1m) in the summit of a prominent peak at the southern end of the Chemiangel ridge forms this site. With roughly vertical walls carved out of the exposed bedrock and a flat base (Figure 151), the site resembles the general architecture of AB14-070 which could imply an IJ origin. Considerable effort has been expended to carve the site out of the natural rock which is more a feature of IJ positions than the more hastily improvised US positions constructed with minimal resources during the battle. No artifacts were evident, but, given the extensive 360° views from this position, it is quite possible that the site may have served both IJ and US forces as an observation post.

Figure 151 - AB14-085: IJ observation post and extensive viewshed to the south-east

3.2 PAS'2010 Survey Sites Revisited

Towards the latter part of the 2014 fieldwork season, a number of sites previously recorded during the 2010 archeological survey were revisited. The aim of these revisits was to assess the impact to site condition and integrity of increased battlefield tourism and four years of tropical weather, including several major typhoons. A total of 30 previously recorded sites were revisited: many of these are located in highly visible or easily accessed locations that are both exposed to nature and are commonly included in tour group itineraries. Several of the cave sites within the CCZ and on Radar Hill were also included as a means of comparing the relative impacts of these two factors on more remote sites. A general visual inspection and photographic survey was undertaken at all locations with six sites selected for a more detailed re-survey and issued with 2014 survey numbers respectively. The re-survey of these six sites was undertaken where significant changes to a site had taken place that warranted written documentation or where the application of new survey techniques fielded by the UoA team during 2014 were considered to add significantly to the understanding and interpretation of a site. Each site revisited is discussed separately within this section, but, generally speaking, all were found to have fared fairly well over the past four years with a few minor exceptions. Structurally, most sites exhibited little notable change with no evidence of major collapse or degeneration as a result of natural or human action.

Portable artifacts associated with sites were, however, another matter. In all cases where artifactual material is present, whether in situ or deposited post-war, evidence of deliberate disturbance or movement of individual items and, in some cases, entire assemblages was observed. No distinct pattern appears to exist between geographical location and scale of disturbance; some sites next to main roads have seen little artifact loss or movement where as some caves in Wildcat Bowl have undergone major change. Lindsay, Knecht and Price have recently published on the matter of collecting experience and looting practice on Peleliu highlighting how site integrity is affected by an artificial feeling of 'first discovery' and the associated false sense of entitlement to a souvenir that appears to exists amongst visitors to sites off the beaten track (Price *et al.* 2015: 228). With such a dynamic jungle environment constantly regenerating itself around sites, even those that have been visited countless times previously offer the 'discoverer' illusion to the amateur jungle exploring tourist. For other people who are out to recover artifacts for financial gain, the feeling of isolation only serves

to encourage what, in some cases, can best be described as a systematic processing of cave assemblages.

It should be emphasized that in the majority of cases, revisited sites appeared to have lost little of their previously noted artifact inventories and that objects merely exhibited signs of being picked up, looked at and then replaced, sometimes in a different location. However, as the example of AB109 demonstrates, this activity in itself, although not physical removal, can lead to the loss of objects by speeding up decay and corrosive processes through destabilizing the environmental conditions in which artifacts reside. Contextual information which is so critical to the interpretation of these sites is also lost through this process of artifact movement. The site revisiting process confirms what has been suspected by the authors which is that site visits in the CCZ are on the increase and that site disturbance and rate of artifact decay is subsequently exacerbated. Despite loss of some artifacts and contextual information for others, the revisits (particularly those that were re-surveyed) also demonstrate that even frequently visited, heavily disturbed sites still contain unprecedented levels of archeological data that can contribute greatly to the understanding and interpretation of individual sites and the battlefield as a whole. As such there is still much to be gained from studying and protecting these sites.

Previous Site #	PAS'14 Site #	Site Description	Area
AB28 (PAS'10) 23.1 (Denfeld)	AB14-107	IJ Concrete Air-Raid Shelter	AIRFIELD COMPLEX
AB38 20.1 (Denfeld)	N/A	Japanese Air Headquarters Building	AIRFIELD COMPLEX
AB63	N/A	Japanese Defensive Cave w/AA gun	SOUTHERN RIDGES
AB67	N/A	Japanese Aircraft Pilot Seat	DEATH VALLEY
AB68 29 (Denfeld)	N/A	Last Japanese Command Post	DEATH VALLEY
AB81 (PAS'10)	AB14-110	Artificial Cave - Navy H-type - IJN secondary communications cave	WILDCAT BOWL
AB82	N/A	Japanese Battlefield Monument	WILDCAT BOWL
AB98	N/A	Y-shaped Japanese Defensive Cave	WILDCAT BOWL
AB110	N/A	Japanese Defensive Cave	WILDCAT BOWL
AB115	N/A	American 1000 lb. Napalm bomb	WILDCAT BOWL
AB122	N/A	Japanese Defensive Cave	WILDCAT BOWL
AB123	N/A	Japanese Bomb 100 Kg. Type 99	WILDCAT BOWL
AB124	N/A	Japanese 100Kg. Bomb Cache	WILDCAT BOWL
AB126 (PAS'10)	AB14-038A	IJ 70mm Type 92 Battalion Gun	WILDCAT BOWL
AB132 18.3 (Denfeld)	N/A	American LVT(A) with Stuart Turret	SOUTHERN RIDGES
AB133 18.1 (Denfeld)	N/A	200mm Japanese Gun in Defensive Cave	SOUTHERN RIDGES
AB138 24 (Denfeld)	N/A	American LVT(A)4 and LVT2	AIRFIELD COMPLEX

AB139	N/A	American LVT4 with ramp down	AIRFIELD COMPLEX
AB141 22.5 (Denfeld)	N/A	IJA Type 95 Ha-Go Light Tank	AIRFIELD COMPLEX
AB145 (PAS'10) 17 (Denfeld)	AB14-111	Artificial Cave (Navy rectangular-type) - storage cave	SOUTHERN RIDGES
AB149 & 150 4.2 & 3 (Denfeld)	N/A	Orange Beach Cemetery, Flag pole & Stand, Chapel Ruins	ORANGE BEACH
AB155 39.1 (Denfeld)	N/A	Japanese Phosphate Plant Loading Platform	NORTH PELELIU
AB156 38.2 (Denfeld)	N/A	Japanese Pillbox	NORTH PELELIU
AB165 (PAS'10)	AB14-112	Artificial Cave (Navy I-type) - contains electrical gear	RADAR HILL
AB166 46.1 (Denfeld)	N/A	U-Shaped Japanese Defensive Cave	RADAR HILL
AB167 46.3 (Denfeld)	N/A	Radar Antenna Platform	RADAR HILL
AB168 14 (Denfeld)	N/A	Japanese Fuel Storage Bunker/ WWII Museum	RADAR HILL
AB231 (PAS'14)	AB14-108	Natural Cave Rock Shelter - improvised fighting position	SOUTHERN RIDGES
AB273	N/A	Improved Natural Cave (vertical-type) - IJN Communications Centre	SOUTHERN RIDGES

AB28 / AB14-107 IJ Concrete Air-Raid Shelter

Perhaps one of the most obvious changes to a site that has taken place in the past four years can be observed at AB28. When first encountered in 2010, this reinforced concrete air-raid shelter was so heavily overgrown with dense jungle vegetation that it proved difficult to survey or even photograph and as such only received a very general description. Since then, the immediate environs of the site (c.6m on all sides) has been entirely cleared of vegetation with only low lying grassy scrub maintained around the perimeter of the structure. Located next to a main road, the site is now highly visible and accessible with the interior also cleared of any debris and easy to enter. All metal blast shutters and hatches remain intact and the general condition throughout appears to be sound and stable. Some small plants have begun to take root in crevices and fractures in the concrete which, if left unchecked, could, with time, reduce the integrity of the structure. The cleared vegetation permitted a full exterior photogrammetric survey to be carried out (Figure 152) and accurate overall measurements to be taken offering a good representative record of this air-raid shelter type, four of which were noted in 2010. This example is a mirror image of AB12 which has its main entrance and escape hatches located on opposite elevations to AB28/AB14-107. Historical photographs indicate that a lean-to structure once existed against the northern elevation, however, no evidence of this remains (Figure 153).

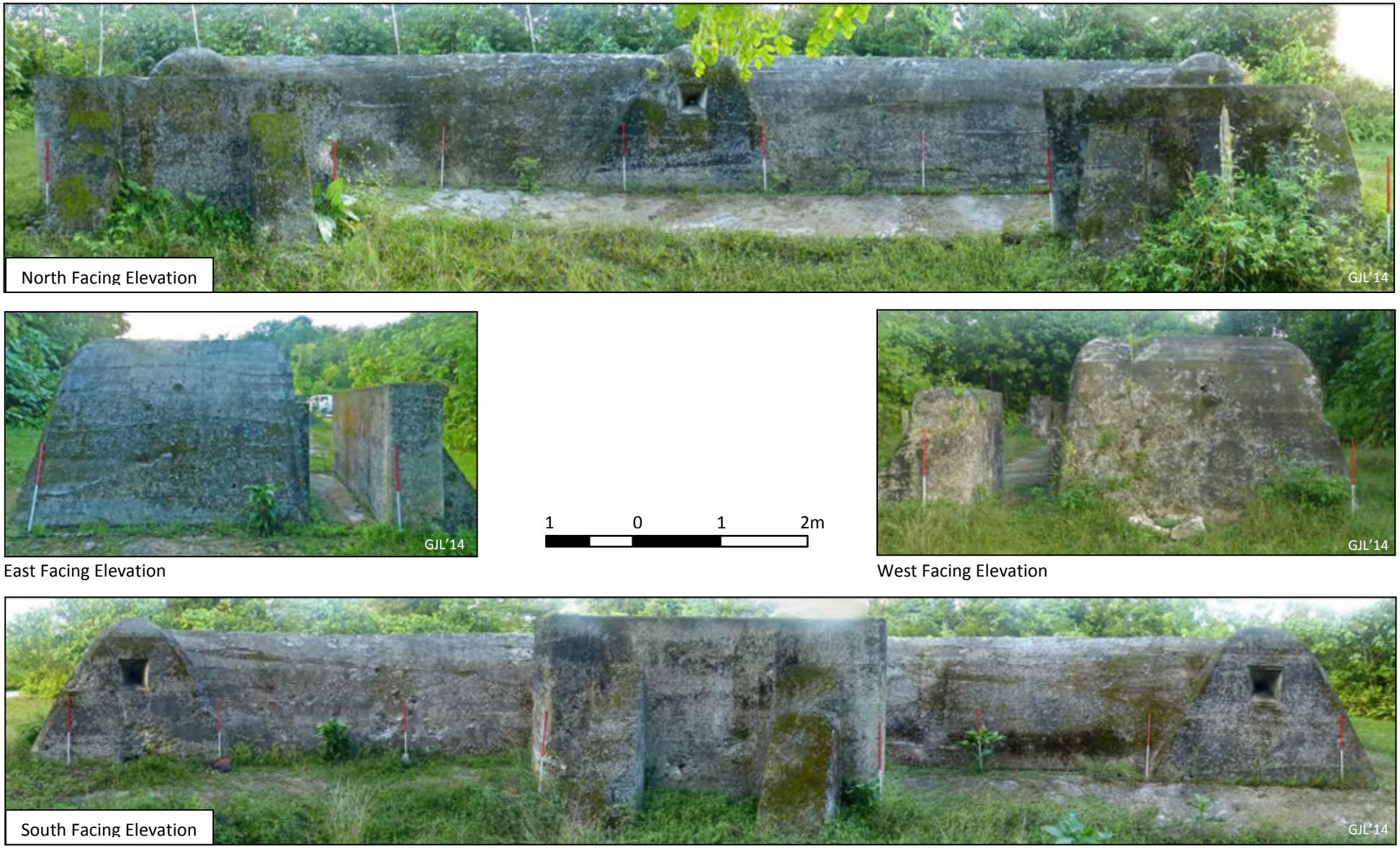


Figure 152 - AB14-107: photogrammetric survey of IJ air-raid shelter

Figure 153 - AB14-107: north elevation 16/09/44 (left) and south elevation 26/10/44 (right)

AB38 Japanese Air Headquarters Building

Considered to be of major historical importance for Peleliu and wider Palau (Knecht *et al* 2012: 120), the Japanese Air Headquarters Building was revisited to identify any major changes to condition. Although generally appearing to be in a very fragile state, with structural weakening caused by battle damage and vegetation grown, the exposed concrete reinforcement, collapse and exposed reinforcement showed little sign of dramatic change in the past four years (see Figure 154). Areas of vegetation, that were removed prior to 2010 to alleviate strain on critical structural components such as the ground floor pillars, have not grown back and only fairly small pockets of recently developing vegetation were observed. Portable items such as a USMC jerry can which had sat on the front steps in 2010 were now absent, but the modern Japanese prayer wheels remain intact on the forward columns. Access was obtained to the rear, bunker-wall enclosed, second floor room during the survey. This was found to consist of a single room with a central ceiling support column in good structural condition. A number of wall and floor cable ducts were observed which would have served the installed radio transmitting and receiving equipment. The most notable feature of this room is the remarkably well preserved parquet flooring which survives to varying degrees of integrity across the full extent of the floor area (Figure 155).

The American Motor Pool Quonsets (AB38.2) were also examined. The partially collapsed example observed in 2010 remains in the same condition with the roof sloping down towards the rear where the lowermost sections of corrugated iron on one side have disintegrated leading to a wholesale drop in height of the building along that side. The single, full standing

example lying parallel to the air headquarters building remains in a perilous state. Inspection of the lower corrugated iron sheets revealed that the forward panels on the southern side had completely rusted away from the hoop frame and concrete base (Figure 156). It is really only a matter of time before corrosion extends further along this site leading to a collapse.

Figure 154 - AB38: Japanese Air Headquarters Building 2010 (left) and 2014 (right)

Figure 155 - AB38: second floor room showing detail of parquet flooring

Figure 156 - AB38:2: American Motor Pool Quonset showing corrugated iron corrosion since 2010

AB63 Japanese Defensive Cave w/AA gun

As the first major point of interest along the 'Battle of Peleliu Jungle Trail', this site has received considerable tourist footfall each year since its creation by Cleared Ground Demining. Perhaps unsurprisingly the visual inspection revealed that the artifacts around the cave site have moved. Most obvious is the IJ 25mm Type 96 gun barrel which has moved from the left side of the cave entrance to the right side (Figure 157). Such a substantial item as this may have been re-erected after falling over during a storm or more likely when visitors have posed with it for photographs. Many of the empty 25mm magazines have also moved around the cave opening with only a handful that are either partially buried or located deeper within the cave remaining in the same location as they were found in 2010.

AB67 Japanese Aircraft Pilot Seat

The aluminum seat from an IJN Yokosuka P1Y1 medium bomber remains unchanged on the jungle floor where it was found in 2010. It is now situated by the side of an extension to the

Battle of Peleliu Jungle Trail which continues through Death Valley to site AB68 (Last Japanese Command Post). Moss growth was observed along ridges in the seat back molding and the rolled edges (Figure 158). Coral boulders in this part of the jungle were also seen to be more heavily covered in moss indicating that a change in the environmental conditions in this part of the jungle and surrounding the artifact has taken place since 2010. It is unclear whether this is a result of undergrowth being cleared to make way for the trail, temperature fluctuations, increased humidity or foliage thinning from recent typhoons.

Figure 157 - AB63: cave site showing 25mm AT/AA Gun and magazines in 2010 and 2014

Figure 158 - AB67: IJN Yokosuka P1Y1 seat showing moss growth since 2010

AB68 Last Japanese Command Post

As the site where Major General Murai and Colonel Nakagawa committed ritual suicide and the final redoubt of organized resistance on Peleliu, the Last Command Post is a particularly poignant and important battlefield location. During both visits, offerings of fresh flowers were evident near the passage leading from cave A into cave B. Additional deposits visible in 2014 within lower cave B included a black and white striped staff, square flag depicting the Imperial Japanese rising sun emblem and a religious figurine. These artifacts clearly and powerfully illustrate the continued importance of AB68 as a place for commemoration, remembrance and reflection for visitors to the site. This special regard, perhaps even respect and atmosphere of reverence created, for the site and its meaning could account for the very limited interference with the historical material remains that exist in and around the site. A coral rock shelf littered with interesting, arguably tempting, fragments of US and IJA equipment and ordnance has been left untouched. An assemblage of five very well preserved IJA gas mask canisters (x2 'model 95', x3 'model 99') and a water canteen remain exactly as they were observed in cave C in 2010 (Figure 159). Perhaps the most disturbance has been to a mixed assemblage of objects located near the entrance to cave B where some of the more unusual or better preserved items have moved from being picked up, rotated and then replaced (Figure 160). A large fragment of IJA helmet now lies in many more, smaller pieces than before, likely as a result of natural corrosion as the thinner crown section has collapsed. Aside from these subtle changes, the site remains intact and in good condition. Other than the damage caused to artifacts by the corrosive action of a naturally harsh environment, the respect observed by visitors to the site is likely to safe guard its integrity into the future.

Figure 159 - AB68: gas mask canister assemblage in the lower confines of cave C

Figure 160 - AB68: material assemblage at the entrance to cave B

AB81 / AB14-110 Artificial Cave - Navy H-Type

With a large Japanese monument erected at its entrance (Figure 161) and situated as it is only some 80m from the most commonly used southern access into Wildcat Bowl, AB81 is an easily accessed and well frequented site. When surveyed in 2010, the interior of the cave already displayed evidence of recent disturbance with much of the rubble and larger artifactual material piled to either side of the main passageways. The pattern and scale of re-deposition in this cave was the worst witnessed by the authors in 2010 and a revisit in 2014 was conducted to evaluate whether further disturbance activity had taken place in the intervening years and whether it is possible to draw any additional information about the history of the site from what survives.

AB81 was re-surveyed using more accurate digital measuring techniques than those available to the UoA team in 2010 and a systematic mapping exercise was conducted which included a detailed inventory of the material assemblages as they appeared in 2014 (Figure 162). This was considered worthwhile because in the experience of the authors, from examples seen across Peleliu, generally artifacts disturbed by visitors and looters have been found to only travel over small distances within the cave interior as looters, in particular, discard unwanted objects close to the area they are searching in. 'Discarded' artifacts are therefore unlikely to have moved outside of the niche, chamber or passageway in which they were originally deposited during the battle allowing them to still offer insight into the activities and events that have taken place in cave areas during their original occupation.

Figure 161 - AB81/AB14-110: Japanese memorial outside entrance showing movement and 'tidying' of deposited artifacts as well as the appearance of more formal liquid offerings

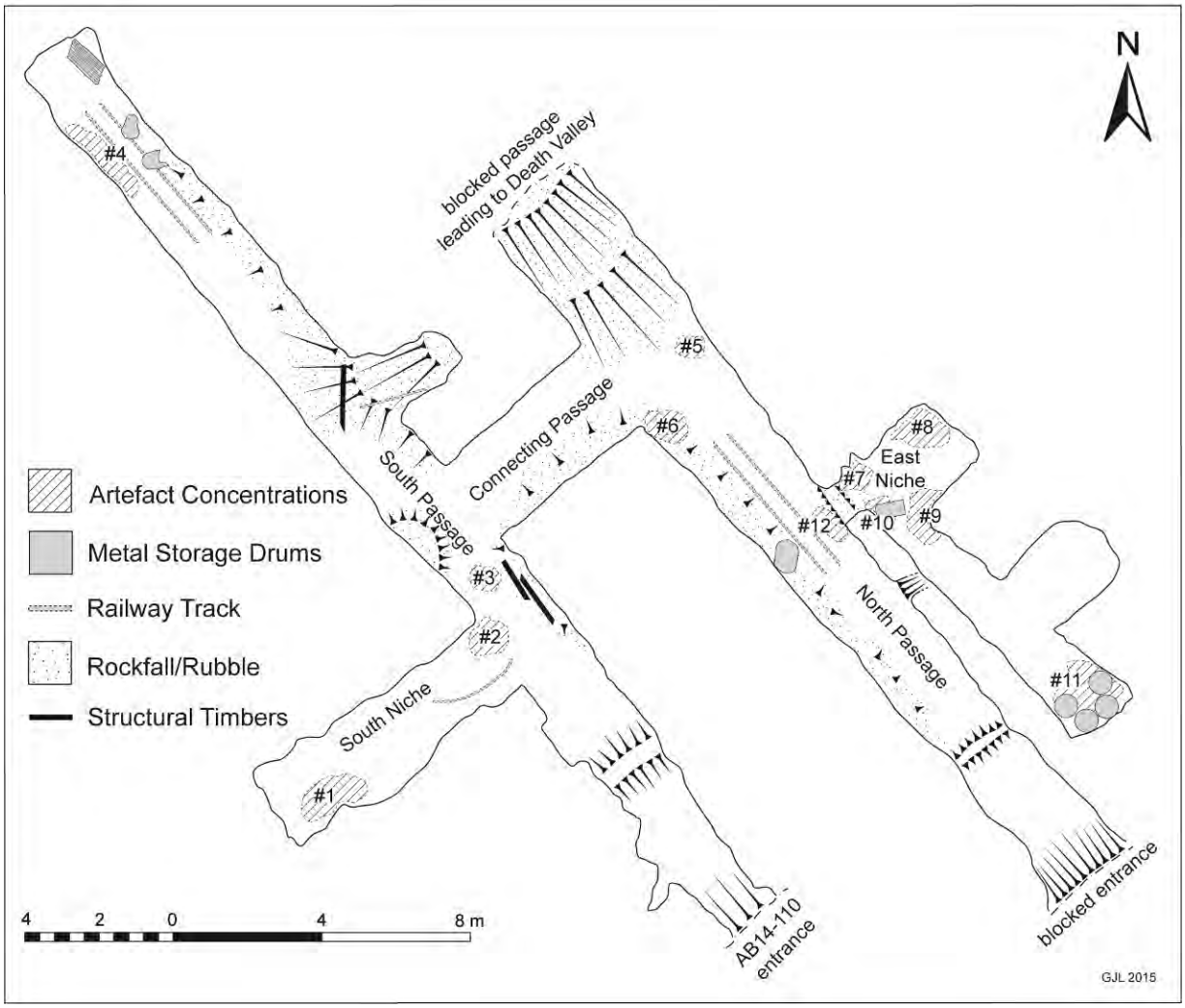


Figure 162 - AB14-110 cave interior floor plan

Using the cave location photograph, map and layout description provided by Phelan in his report (1945: 5), the authors interpreted AB81 as a secondary communications cave to which IJN signals personnel withdrew following the evacuation of the primary communications center (AB273) and IJA battle command post (AB146) in the southern ridges (*ibid.*: 36 and Knecht *et al* 2012: 203). The re-survey of the cave interior has proved highly beneficial for substantiating this interpretation further as the digital measurements of the secondary passage and branches were found to match (once converted from Imperial to Metric) those on Phelan's annotated plan of the IJN communications cave. The digital measurements therefore help to further confirm the connection between the two sites. Phelan also described the IJN communications H-type cave as having a passageway running through the 5 Sisters ridge from Wildcat Bowl to Death Valley. Lindsay, Knecht and Price interpreted the large rubble mound at the northern terminal of the north passage as likely marking the sealed end of this connecting tunnel (Knecht *et al* 2012: 203). As part of the PAS'14 post-fieldwork analysis phase, the 2010 site locations were uploaded into GIS allowing physical relationships between sites to be studied more fully. Site AB77 was not accessed in 2010 owing to a high risk from ERW at the entrance but its relative position in Death Valley was found to align well with AB81 on the opposite side of the 5 Sisters ridge. AB77 might therefore be the opposite end of the blocked passageway in AB81.

The re-survey was particularly effective in identifying assemblages of small, disarticulated human remains which were found throughout the cave interior. These remains were either partially burnt fragments or intact small types such as the phalanges, metacarpals and metatarsals of the hands and feet. Being small and difficult to see in the low light conditions, these bones have escaped the notice of previous official or unofficial bone recovery operations and are unlikely to have moved far from their place of deposition. Given the size of the cave and scale of distribution, it is likely that the seven groupings of human bones represent at least four individuals. The least disturbed assemblage (**#**4) near the south-west end of the south passage included teeth and small burnt fragments of larger, now unidentifiable, bones. Brass and brown buttons were amongst this assemblage indicating that the individual concerned was most likely an IJN CO or NCO (Jowett 2002b: 35-36). The IJA stopped using brass tunic buttons following the release of the Type 98 tropical uniform in 1938 (Jowett 2002a:21-22). In addition to the tunic buttons and human remains, a half section of IJ helmet, a spread of smaller metal fragments (likely parts of the helmet) and the

conical, metal cavity lining of a US 2.36” hollow/shaped charge HEAT rocket projectile were amongst assemblage **#**4 (Figure 163). Located at the opposite end of a straight passage in direct line with a cave entrance, this combination of material illustrates an all too clear picture of the defense and assault of this cave, powerfully depicting the final moments of an IJN officer.

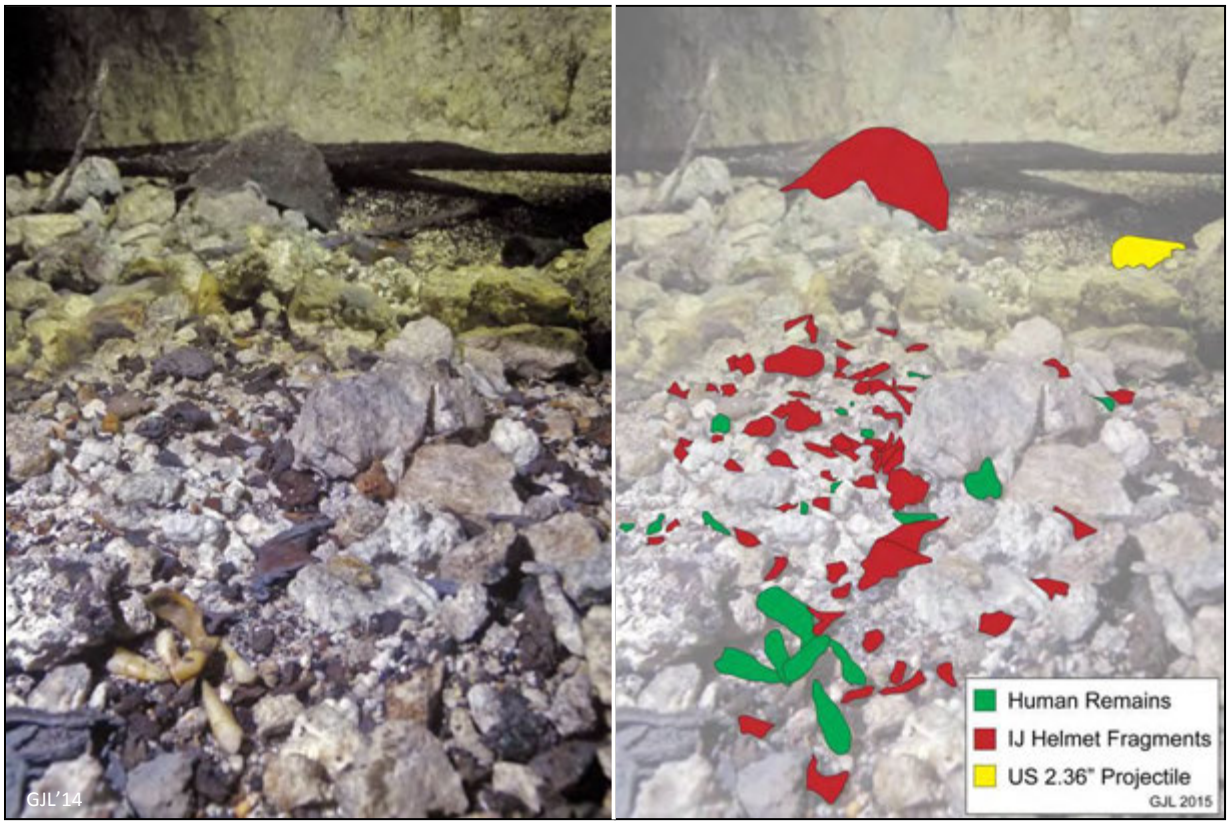


Figure 163 - AB14-110: assemblage #4 with feature schematic

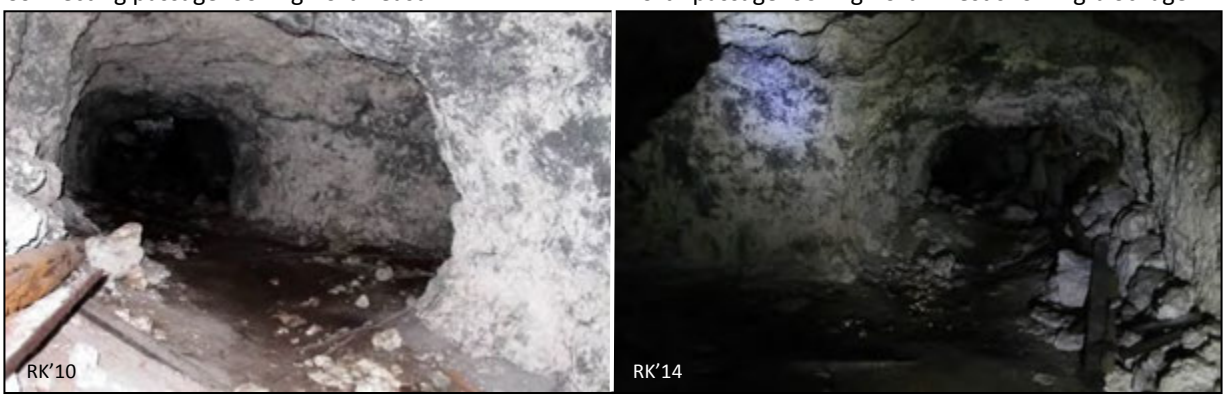
Large timbers were observed amongst the piled rubble in the two main passages which correlates with Phelan’s description of walls, ceiling supports and a wooden floor (Phelan 1945: 5). A pneumatic drill, a hammer and chisels point to the cave not being fully complete with further work ongoing or intended. A soap dish and a small cache of IJ mess kit lids indicates that the primary living areas were in the niches to either side of the main passages. A variety of ordnance and heavy weapon components such as an IJ 81mm mortar base plate (possibly IJN Model 3 or IJA Model 97), a 50mm Type 89 mortar bomb, 7.7mm ammunition and an IJ Type 91 hand grenade indicate that the cave had a mixed, able defensive and offensive capability. This assortment suggests that the cave exceeded its initial purpose as a secondary Navy communications center and adapted to a combat role as so many shelter and storage caves were forced to do as the front lines moved steadily closer.

Although AB81/AB14-110 has seen much disturbance in its biography and likely lost many artifacts since the end of the battle, the detailed survey in 2014 has demonstrated that there is still valuable insight to be gleamed from what remains. A further positive outcome is that photographic comparison between 2010 and 2014 demonstrates that disturbance in the past four years has been minimal. Little significant change is apparent in the main passages where the major rubble movement and passage clearance activities have taken place in the past (Figure 164). Some artifacts in the east niche have moved, but most have remained within the confines of the niche. Likewise the material in assemblage #4 would appear to be almost entirely untouched and in situ; its location at a passage terminus behind multiple coral rubble debris spreads and not on a main thoroughfare has likely aided the assemblage integrity.

South passage at intersection looking north-west in 2010 (left) and 2014 (right)

Connecting passage looking north-east

North passage looking north-west showing blockage



Entrance to south niche looking south-east in 2010 (left) and north-west in 2014 (right)

Figure 164 - AB14-110: cave interior images

Artifacts Noted (by assemblage #):
South Niche: cast iron narrow gauge rail **#1:** unfired IJ 7.7mm ammunition • battery fragments • rubber combat boot/shoe heel • IJ soap dish **#2:** small, disarticulated human remains **South Passage:** modern camera case • modern offering basket • timber planks and wall trusses • cast iron narrow gauge railway track set into cave floor • crumpled metal storage drums • flat metal sheet • pneumatic drill components #**3:** small, disarticulated human remains **#4:** disarticulated human remains including teeth, small bones & burnt larger bone fragments • brown IJ plastic uniform buttons • brass IJN officer tunic buttons • IJ helmet fragments • US 2.36" HEAT rocket projectile fragments • burnt timbers • misc. metal fragments **Connecting Passage:** completely disturbed with heaped coral rubble to one side **North Passage:** cast iron narrow gauge railway track set into cave floor • collapsible table frame • unfired IJ 7.7mm ammunition • unfired IJ 50mm Type 89 mortar bomb **#5:** small, disarticulated human remains **#6:** small, disarticulated human remains • rubber combat boot/shoe sole **#7:** small, disarticulated human remains **#8:** aqua-blue glass shards • small arms ammunition • IJ respirator tissot tube fragment **#9:** hammer • chisel • IJ leather ammunition pouches • IJN 'model 93' No.2 gas mask canister, eye lens & tissot tube fragments **#10:** disarticulated human remains • undetonated IJ Type 91 hand grenade • IJ belt buckle **#11:** IJ mess kit lids & trays • x4 in situ metal storage drums **#12:** 81mm IJN Model 3 or IJA Model 97 mortar base plate

AB82 Japanese Battlefield Monument

The Japanese Battlefield Monument located near the main southern access to Wildcat Bowl was found to be in a poorer state of care than had been witnessed in 2010. Although the monument itself remains structurally intact and shows no signs of degradation, the ground around it appears unmanaged and has become overgrown (Figure 165). In contrast to the increased commemorative activity observed at the AB81 monument, the prayer sticks, liquid and floral offerings that once festooned AB82 were absent during the revisit. Many of the same artifacts seen at the base of the monument in 2010 (e.g. IJ mess kit components, decaying IJN gas mask canister, IJ 100kg bomb nose and half of an IJ helmet) remain, albeit more heavily degraded and positioned slightly differently. The evidence suggests that there have been visitors to the site over the past four years who have taken an interest in the objects deposited at the base of the monument but that the importance of the site as a place of formal remembrance has reduced. Perhaps with demined jungle trails providing safer, improved access to archeological cave sites such as AB68 and AB81 where the fighting is more starkly apparent and therefore more tangible, this trackside monument has become less significant as a place of pilgrimage, reflection and votive offering.

Figure 165 - AB82 Japanese Battlefield Monument in contrast between 2010 and 2014

AB98 Japanese Defensive Y-shaped Cave

As one of the more inaccessible cave sites tucked away off the beaten track, AB98 was found to contain an incredibly intact material record including many small, portable artifacts of particular rarity and interest. Disarticulated human remains including a mandible were also present here as was a considerable quantity of ERW in a very fragile and advanced state of decay. Comparison with the comprehensive photographic record from 2010 has revealed significant disturbance to the artifact assemblages. In some instances objects have remained but have been reoriented or moved (Figure 166). Some of this may have been caused by visitors, however, much of it is likely a result of the careful and systematic recovery of ERW material by CGD teams following the 2010 survey. Most of the moved artifacts were located near ERW and have understandably been repositioned, or in some cases removed, to facilitate a safe working environment as well as improved access to and treatment of hazardous materials. For example, Figure 167 depicts the loss of the wooden pigeonhole storage rack which has likely been removed on account of it being covered in explosive picric acid. Human remains recovery is also evidenced through the absence of the mandible and tarsal bones from amongst the medical assemblage (Figure 168). Perhaps most encouraging is that although ERW and human remains have been removed, the core of the cave inventory, including most of the small portable items, remains intact which indicates that this remote site has remained undisturbed by looters.

Figure 166 - AB98: artifact assemblages disturbed by visitors and ERW removal (2010 images on left)

Figure 167 - AB98: cave interior showing disturbance to main assemblage and loss of wooden pigeonhole storage rack

Figure 168 - AB98: medical assemblage showing artifact movement and removal of human remains

AB110 Japanese Defensive U-shaped Cave

Roughly opposite AB98, this cave is equally distant from the main tourist sites and cleared jungle trails yet it showed far more evidence of recent activity. Japanese prayer sticks and other votive items associated with commemoration were in evidence within the cave interior. The majority of artifact assemblages remained intact and relatively undisturbed (Figure 169) with some rare items such as a Japanese battery powered hand torch (flashlight) remaining. However, other rare artifacts such as a partially melted IJ set-square and a ceramic pomade jar were absent. The heavily corroded barrel assembly of either a 6.5mm Type 96 or 7.7mm Type 99 LMG found just inside the cave mouth in 2010 has since been propped outside. Although it is unclear why the barrel has been moved, its new position assists with identifying and locating the cave from the jungle floor. This exposed placement not only places this artifact at increased risk of expedited decay from the elements but also places items within the cave at greater risk from future disturbance and looting by drawing attention to the presence of the cave. With improved access, an increased general public interest in the Battle of Peleliu, more tourists and a burgeoning market for WWII memorabilia, the integrity of many of Peleliu's valuable cave site assemblages relies on the same two characteristics that made them so effective as defensive positions in 1944: inaccessibility and concealment.

Figure 169 - AB110: main passage showing little change to an artifact assemblage lining the wall

A notable difference between 2010 and 2014 is the advanced degradation of fragile artifacts such as gas mask tissot tubes and leatherwork where significant decay and consequential

fragmentation was observed (Figure 170). The deterioration of these artifacts over a relatively short period of time suggests that the environmental conditions surrounding the objects is unstable. Changes in cave climate could be attributed to an increased number of visitors entering the site and handling objects. In 2014 the interior of AB110 was found to be only marginally cooler (85.8°F (29.9°C)) than the jungle floor (86°F (30°C)) and 5% drier (79% humidity inside). Perspired moisture and radiated body heat exuded from groups moving around in the confined, poorly ventilated, humid conditions would lead to temporary fluctuations in atmospheric temperature and chemical composition. Expanding populations of *Rhaphidophoridae* feeding on an increased level of algae, in turn caused by higher humidity levels, will produce more acidic excreta which could equally be having a detrimentally effect on the already fragile artifacts.

Figure 170 - AB110: IJN 'model 93' gas mask in 2010 & 2014 showing decay and artifact removal

AB115 American Corsair Belly Tank/Napalm Bomb

By far the most intact example of an F4U Corsair drop tank recorded on Peleliu, this 265 gallon external fuel tank lies fully exposed to the natural elements on the jungle floor. It was therefore no surprise to observe progressive metal loss around the base of the mounting bracket and central, upper tank casing (Figure 171).

AB122 Japanese Defensive Cave

Few noteworthy changes were observed at this L-shaped cave. The interior inventory remains intact with the US communications cable drum, IJ metal rice bowl and 7.7mm ammunition still extant. Additional IJ 7.7mm Type 92 HMG strip clips were identified across the floor area along with perforated IJ mess kit components and miscellaneous twisted metal

fragments. Shallow cave soil deposits were dry with little evidence of recent disturbance suggesting that this cave has been rarely visited, if at all, since 2010.

Figure 171 - AB115: progressive metal corrosion on F4U drop tank

AB123 & AB124 Japanese Bomb 100 Kg Type 99 Bombs

Similar in form and condition, the two groups of Type 99 bomb casings located south of a main tourist trail through Wildcat Bowl were found to be in a good, undisturbed state. Many of the bombs remain partially buried in the undergrowth which in some places appears to be gradually engulfing the exposed components further. Subtle corrosive increases were visible but these were slight. One bomb tail appears to have been rotated in situ (Figure 172).

Figure 172 - AB124: Type 99 bomb cache, note partially revolved tail assembly on left-most bomb

AB126 / AB14-038A IJ 70mm Type 92 Battalion Gun

A familiar landmark to many a visitor exploring Wildcat Bowl, this battalion gun has become a common subject in tourist photographs populating WWII amateur interest forums on the internet. Vegetation growth and changes to the mixed arrangement of artifacts deposited within the confines of the metal wheel rim have occurred since 2010 but the gun itself remains otherwise unchanged and in good condition (Figure 173). Interestingly the objects

once located within the wheel rim have spread more widely across the area around the gun and to either side of the tourist trail. Some of them such as a wheel hub (that could be mistaken for an IJ 7.7mm Type 92 'Lewis-type' drum magazine by an amateur enthusiast), an IJ metal cup and a number of mortar base ends have been balanced on various parts of the gun itself. A US 81mm M56 HE (Heavy), M57 WP Smoke or M301 Illuminating mortar base end with fin assembly has also been inserted into the breech (Figure 174).

Figure 173 - AB14-038A: IJ 70mm Type 90 Battalion Gun in 2010 and 2014

Figure 174 - AB14-038A: open breach showing insertion of US 81mm mortar fin assembly since 2010

AB132 American LVT(A) with Stuart Turret

This amtrac or Landing Vehicle Tracked (Armored) Mk.1 (LVT(A)1) is another well visited tourist destination and continues to stand guard over the steps leading to AB133 as it has done since its first documentation by Denfeld in 1981 (1988:71). Other than variations in the foliage around the LVT, little has changed since 2010 (Figure 175). The painted serial number (12G338) and white US Star on the rear wall of the hull remain visible and no significant degradation to the steel plating or aluminum internal components is apparent.

AB133 200 MM Japanese Gun in Defensive Cave

No noteworthy changes in condition or site integrity were observed. The single ERW item wedged between the breech mechanism and the mounting remains in place.

Figure 175 - AB132: LVT(A)1 in 2010 and 2014

AB138 American LVT(A)4 and LVT2

Both of these amtracs remain structurally unaltered since their initial survey by UoA four years ago and continue to stand on display as recorded by Denfeld in 1981 (1988:71). Although the steel hull and aluminum internal components appear to be in a highly corroded state, any decay that has taken place since 2010 was not obvious upon inspection. Artifacts deposited on the hulls of the two vehicles are still present as is a crumpled aluminum aircraft external fuel tank located nearby. The perforated compressed air or oxygen tank that had once stood on the port buoyancy pontoon of LVT2 has since moved to LVT(A)4 where various other artifacts reside (Figure 176). All objects noted in 2010 are accounted for but have moved to different positions along the top of the port buoyancy pontoon as they have been picked up, examined and replaced by curious visitors. A square, riveted aluminum plate with surviving red oxide primer paint has now joined the collection and carved, painted log identification signs have been placed in front of both LVTs.

Figure 176 - AB138: LVT(A)4 with artifacts placed on hull and port buoyancy pontoon

AB139 American LVT4

The LVT4 remains clear of vegetation but in a fragile state (Figure 177). No major structural collapse or metal deterioration is evident since the previous assessment; however, it is possible that less visible elements may have weakened since 2010. A full conservation assessment and stabilization plan for all exposed WWII vehicles on Peleliu are still recommended if continued public display and long term preservation is desired.

Figure 177 - AB139: LVT4 in 1944, 2010 and 2014

AB141 IJA Type 95 Ha-Go Light Tank

Very little change to the structural integrity of the most complete Type 95 light tank on Peleliu. A loose, metal grilled engine air intake hatch and another large fragment of miscellaneous metal have been placed under the front of the tank from their previous position in 2010 atop the forward hull. Vegetation growth has been kept under control and is much less than it was four years previous allowing more of the tank interior to be viewed. Metal corrosion appears no further advanced and the rubber treads on the return rollers and twin bogie mounted road wheels remains intact throughout. No evidence of the tank's turret was found.

Two medium caliber impact marks on the starboard side indicate the direction that the tank was hit from (Figure 178). One (possibly from a 37mm or 2.36" projectile) has passed through the forward road wheel but failed to penetrate the hull and may have been intended to immobilize the vehicle. The second, larger hole (possibly from a 75mm projectile) penetrates the thin hull plating at the driver's position, a common targeting point based on historic photographs of other disabled Type 95 tanks on Peleliu (See folder 736 in NARA Box 127-GW-46). Outward stressed metal plating on the right side of the crew compartment and the missing turret suggest that the 75mm projectile caused an internal explosion (likely igniting the wall stored 37mm ammunition) which blew the turret clear of the hull.

Figure 178 - AB141: IJA Type 95 Ha-Go Light Tank showing projectile impacts on starboard side

AB145 / AB14-111 Artificial Cave - Navy Rectangular-Type - Storage Cave

This large, reinforced concrete cave was selected for a detailed georeferenced photographic survey to test the suitability of the technique for recording Peleliu's caves. The survey technique was found to be partially successful and holds great promise for future work with methodological modifications. The survey process is discussed more fully in Section 1.1.3 and the resulting photomosaic can be view in Appendix 5. One of the immediate benefits of the photogrammetric survey was the installation of a temporary lighting system in the cave by CGD. Perhaps for the first time in seventy years the cave interior and its remarkable artifactual contents was fully illuminated.

The improved working conditions allowed a more accurate macrofact inventory to be produced. Denfeld's 1981 survey recorded 8 caissons for 75mm ammunition, 2 wheeled trailers, 1 flatbed trailer and large quantities of debris (1988: 70). Working in similar low-light conditions to Denfeld, the 2010 UoA survey saw little to add to this inventory. With the assistance of the CGD lighting system, the 2014 survey has made several significant contributions to the macrofact inventory with a total of 10 horse-drawn artillery vehicles; 1 IJ collapsible hand cart frame and wheels; the wheel sets for a narrow gauge railway bogie; and the metal staves and concrete fill of 2 wooden barrels being recorded (Figure 179). A full and detailed small artifact inventory such as those produced for other caves would have required far more time than has been available in PAS'14. However, the comprehensive photographic coverage of the cave floor has provided sufficient resolution to allow the production of such an inventory in the future. As Denfeld noted, the smaller artifacts are spread across the

entire cave floor. This massive assemblage includes IJ 100kg bomb casings, various projectile fuses, large quantities of explosive magnesium strip, unfired 75mm projectiles, drums of single strand wire, metal points of wooden limber poles, metal storage drums and large numbers of metal ammunition storage trays from the caissons and limbers. Electric light fittings installed on the ceiling are visible and a Japanese inscription reading "*place of the loyal Samurai*" has been written into the cement while it was still fresh on the rear wall (Figure 180). A small group of disarticulated human remains was identified next to the narrow gauge rolling stock. This assemblage included fragments of long bone, a vertebrae, ribs and small bones such as phalanges, metacarpals, and metatarsals.

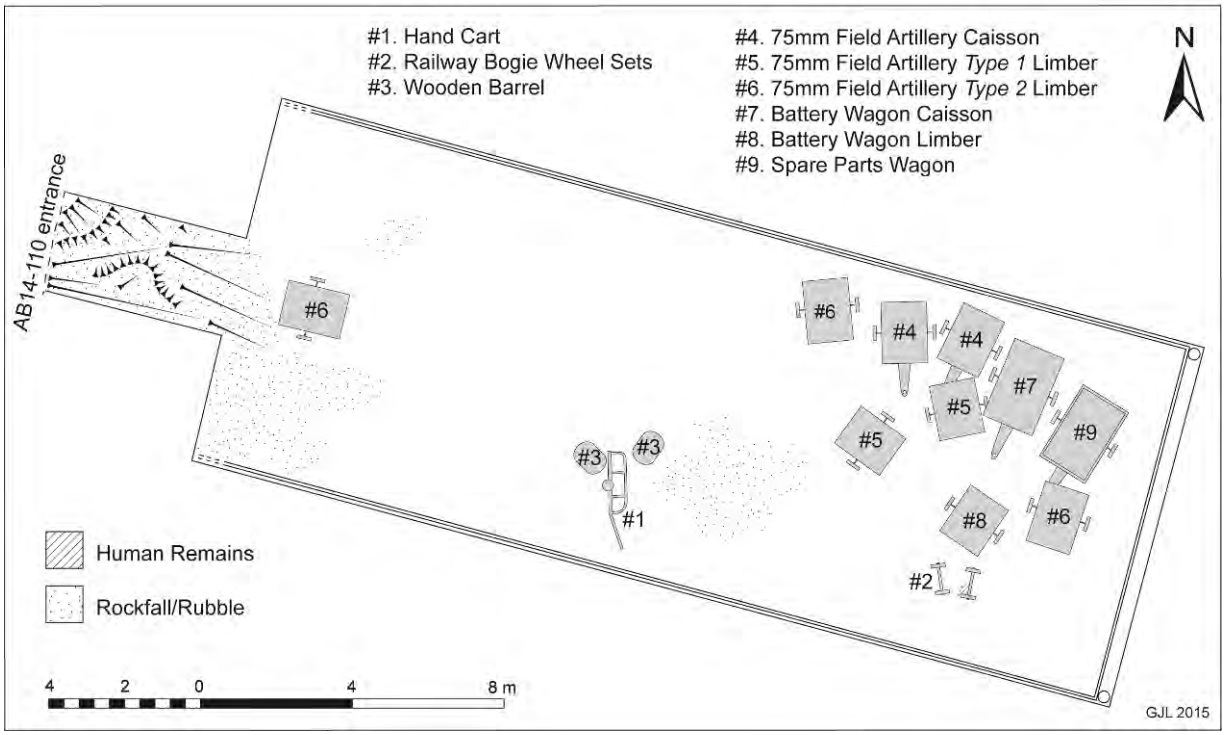


Figure 179 - AB14-111: cave interior floor plan

The artillery field carriages are of particular interest as seven different types were identified. All have surviving metal rims for standard 55" diameter metal shod wooden wheels which confirms them as being used with 75mm field artillery pieces such as the Type 95. Six are classed as field artillery limbers of which three different types are present. Limbers are lighter in weight and have a smaller ammunition storage capacity to caissons (War Dept. 1944c: 295). All of the AB14-111 examples have a pintle hook at the rear to support either the trail of an artillery piece or the stock of a caisson. Two small lunette rings and a socket are located at the other end to take the wooden limber pole and horse harness trace chains. Two of the limber types have the capacity to hold 40 rounds of 75mm ammunition in a metal chest

divided into three columns: two columns accommodate four metal drawers holding four projectiles each while the central column contains two ammunition drawers and a compartment for equipment (Figure 181). The only difference between the two types is a variation in the design of the gun-crew seat on top of the ammunition chest and a pair of small tool storage compartments in the front floor of the *Type 1* limbers (Figure 182). A third limber with an entirely different square grid shelf system in the main storage chest was found next to a large, open topped wagon with similar compartments in either end (Figure 183). Like AB14-042, this pair are likely from a field artillery battery wagon with the square compartments used to store various items of equipment (*ibid.*: 296). Several square-section metal containers were found on the cave floor which would have fitted into these compartments.

Figure 180 - AB14-111: "Place of the loyal Samurai" Price and McQuillen recording Japanese inscription found on rear wall of cave

Figure 181 - AB14-111: limber ammunition chest drawer arrangement

Figure 182 - AB14-111: limber *Type 1* (left) and *Type 2* (right) with ammunition and spares drawers

Figure 183 - AB14-111: Battery wagon (right) and limber, showing square storage detail

The two caissons are similar in design to the limbers but have the characteristic metal stock and lunette ring for hitching the carriage to a limber. They are also of larger capacity (60 rounds each in three columns of five drawers) with an added compartment atop the ammunition chest containing shallower drawers for equipment (Figure 184). Both caissons are positioned behind *Type 1* limbers suggesting that these formed complete caisson and limber sets for 75mm artillery pieces. Toward the rear of the cave is a large, two wheeled, open topped, metal wagon with heavy stock and lunette ring. This is most likely a spare parts wagon used for transporting tools, replacement parts and maintenance as well as general repair equipment (*ibid.*). It is positioned behind a *Type 2* limber suggesting that the two formed a field carriage pair to be towed behind a team of 6 horses.

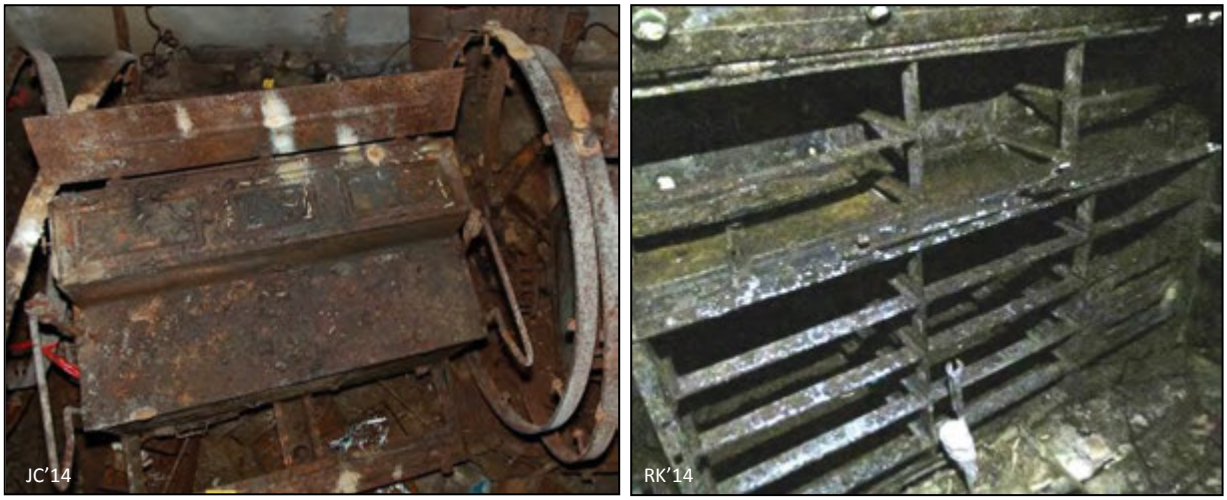


Figure 184 - AB14-111: caisson carriage with interior detail of 60 round ammunition chest

The field artillery carriages found in AB14-111 are an exceptional and incredibly intact assemblage representing the complete complement of different types of carriages used to support a battery of two IJ 75mm field guns. The two *Type 2* limbers situated on their own were likely paired with the guns with a further caisson and limber pair assigned to each gun (*ibid.*: 295). The battery wagon and spares wagon pairs would have served a further supporting role. Historical photographs of the exterior (Figure 185) reveal that the concrete filled wooden barrels likely originated from an improvised defensive barricade erected across the cave mouth during the battle. A large collection of IJ collapsible hand carts near the barricade also indicates the origin of the sole remaining example found inside. Interior historical photographs demonstrate that not only is the caisson, limber and wagon assemblage intact and well preserved but it is also largely in situ. The single *Type 2* limber near the entrance looks to have been wheeled out from the south-west corner to its current

position in front of the entrance between October and November 1944 (Figure 186) but otherwise the carriages have remained unmoved. Undoubtedly further detailed inventory work and analysis of the smaller, floor deposited artifacts will yield further insight into this fascinating cave site.

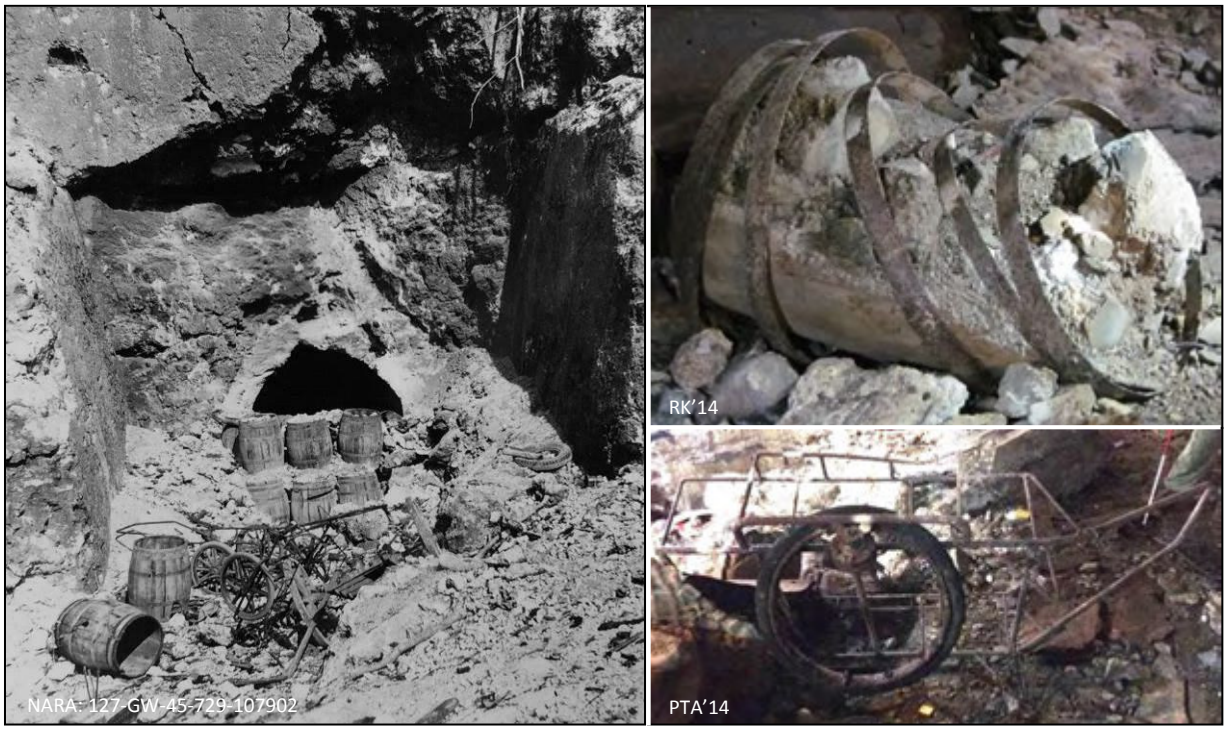


Figure 185 - AB14-111: barrel barricade and cart frames outside cave in 1944 and inside in 2014

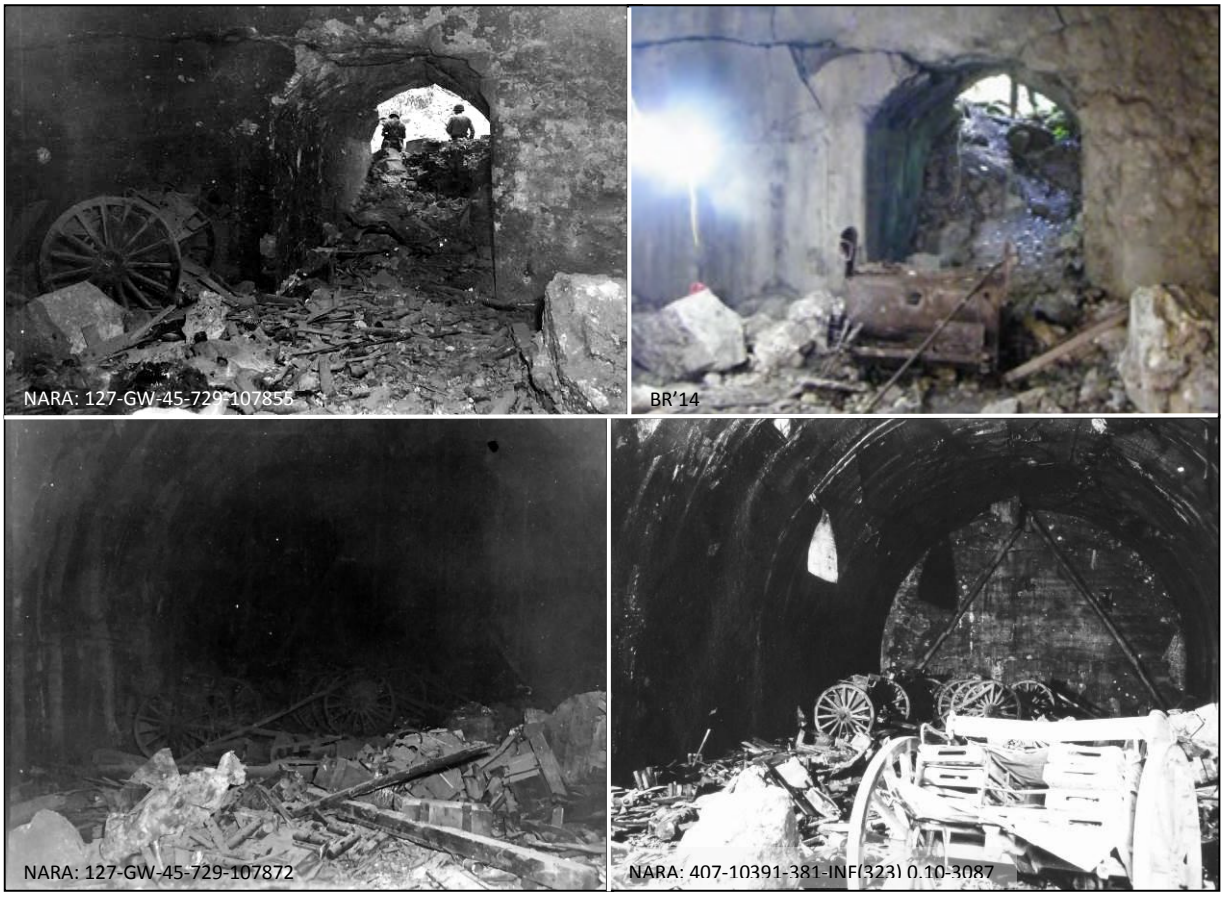


Figure 186 - AB14-111: cave interior Oct. '44 (left), Nov. '44 & 2014 showing movement of limber

AB149 & 150 Orange Beach Cemetery, Flag pole & Stand, Chapel Ruins

The former US military cemetery, associated memorials, dais and chapel ruins were found to be in a good condition in 2014 with vegetation around the principal features cut back and the ornamental 'USA' plant bed well maintained. As experienced at other memorial locations (AB81 and 82) the artifacts deposited around the white painted concrete cross had moved and changed. The USMC helmet which has adorned the head of the cross since at least 2005 still remains but has been turned 180° to face towards the flagpole and chapel beyond. For the most part, the artifact inventory remains unchanged with some objects moving from the base of the cross to the arms and vice versa. A glazed ceramic vessel and floral wreath stands indicate that a more formalized act of commemoration has taken place relatively recently, possibly around the 70th anniversary of the battle of Peleliu in September. Most of the white paint on the cross had also peeled from the cross at the time of inspection in 2014.

The site was visited again during a return visit by Knecht and Price in April 2015 for the Emperor of Japan's official state visit to Peleliu. Significant aesthetic landscape improvement work was found to have taken place in the intervening four months which included grass cutting, undergrowth clearance around the monuments and fresh white paint applied to the dais, the concrete cross and the bases of the 81st Infantry Division monuments. The artifacts on and around the cross had been moved away and deposited out of sight a short distance away. However, the USMC helmet had been repositioned on the head of cross facing once more towards the dais (Figure 187). Vegetation around the chapel ruins had also been cleared away allowing a substantial vertical fracture through the core of the south-east corner to be observed. Without prompt remedial work this section of wall will likely collapse in the very near future.

Figure 187 - AB149: changes to the concrete cross; 2010, 2014 and 2015

AB155 Japanese Phosphate Plant Loading Platform

This large concrete platform was deemed to be in a stable state when visited in 2014 with little visible change in condition noted (Figure 188). A thin layer of vegetation continues to grow on the roof of the platform with moss coating most of the western elevation. Additional information gathered from historic photographs copied at NARA (see Figure 138) and a more detailed review of Murray's interviews with the chad ra Beliliou suggests that rather than being a flat loading platform associated with the phosphate plant and pier AB153, site AB155 represents a surviving portion of the foundation base slab of the pre-war Nan´yō phosphate drying plant (2006: 113). Figure 139 clearly shows that by July 1944 the drying plant had been demolished leaving only the concrete slab, most likely as a result of damage sustained during the air raids in March 1944 when the plant was hit and set on fire (*ibid.*: 134). The conversion from foundation slab to blockhouse can therefore be dated quite accurately to between July and the beginning of September 1944. Its roll and ultimate demise as a pillbox is well documented in historical accounts and in the 2010 survey site description (Knecht *et al* 2010: 244).

Figure 188 - AB155: converted Phosphate Drying Plant foundation slab; 18/12/1944 and 9/12/2014

AB156 Japanese Pillbox

This reinforced concrete pillbox remains in a sound and stable condition with no evidence of cracks or spalling. Some of the graffiti inscribed into the north-west elevation has weathered down and is no longer as prominent as it was in 2010. Vegetation has taken root on the eastern side of the roof where it spreads out across approximately 1.5m. If left unchecked, the roots will likely continue to exploit and expand any hairline cracks in the roof allowing moisture to enter the inner core of the concrete and eventually weaken the structure.

AB165 / AB14-112 Artificial Cave - Navy I-Type

This archetypal I-type combat cave was resurveyed as part of a reassessment of Radar Hill which endeavored to identify any caves or other such IJ defensive positions on this steep sided, strategically important topographic feature that may have been missed in 2010. The large (1.55x1.89m [HxW]), almost oval entrance opens into a single, high ceilinged, smooth walled, level floored rectangular chamber (6.35x2.97x2.20m [LxWxH]). It is one of only four sites that are identifiable as being part of the hill's elaborate defense network of caves. The lack of intact cave sites is understandable given the 321st RCT's extensive use of 155mm guns, M10 tanks and large demolitions charges to demolish the positions of the highly determined IJ defense force they encountered on 1st and 2nd October 1944 (Blair and DeCioccio 2014: 149-154).

This site was selected for re-survey on account of relatively recent disturbance to the floor deposits. Charcoal, partially burnt wood, charred artifacts and heat discoloration of the ground in a relatively contained area (Figure 189) presents evidence of a recent episode of burning. Burnt long bone fragments, part of a rib and an unburnt vertebrae are present within the area of burning as are several expended 6.5mm cartridge cases and c.10 unfired items of 20mm ammunition. The latter ERW was found in a very mixed state with unfired projectiles sometimes separate from cartridge cases which were broken or had split apart, likely as a result of the heat from the fire.

Figure 189 - AB14-112: area of burning, ERW and bone fragments marked by red hazard tape

The motive for the fire is unclear although a number of potential scenarios exist. Although it should be stressed that it is uncertain from the surviving fragments whether the bones are human or pig, an attempted in situ cremation of the bones could have taken place. With the eastern exposure of the cave, some of the 20mm ammunition may have self-combusted in the heat of the sun igniting nearby dry wood. A third theory is that the cave may have served as a shelter for local residents during Typhoon Bopha in 2012. A discarded modern beverage can is present amongst the cave artifacts indicating that someone has visited the cave recently. If the cave was used as a shelter during the typhoon then a fire may have been lit for cooking, light or warmth. If the bones prove to be pig then they may originate from the cooking of joints of pork by the recent temporary dwellers. Regardless of how or why a fire took place, if this was a deliberate act then it highlights a high level of carelessness or disregard for the risks to human life caused by lighting a fire near or on ERW.

Artifacts Noted:
x2 small crumpled metal rice bowls • IJ radio equipment • fragments of burnt & unburnt wood • amber & aqua-blue glass sake-type bottle shards • IJ mess kit tray • unglazed Palauan-type pottery shards • expended 6.5mm cartridge cases • unfired 20mm ammunition: mix of complete, fragmentary & split • burnt & unburnt bone fragments including ribs, long bones & vertebrae

AB166 U-Shaped Japanese Defensive Cave

This large cave was found to be in a similar condition to how it was recorded in 2010. The floor area continues to consist of a fine to medium loose coral gravel overlying a shallow powdery cave soil. On this floor deposit are the various electrical ceramic insulators and miscellaneous metal fragments noted four years previous. The rectangular concrete base for a small engine or generator still remains intact and unchanged. Broken neck shards from aqua-blue glass sake-type bottles and a complete medical-type amber-glass bottle are also present. Towards the western entrance, a small cache of unfired IJ 7.7mm ammunition can be observed protruding at various angles from the floor soil. Several of the cartridge cases have exploded and split open indicating a self-combustion of the propellant charge (Figure 190). This event suggests that this area of the cave has been intensely hot at some stage causing the exposed ammunition to 'cook-off'. This may have occurred during the battle as a result of an explosive charge detonating within the cave entrance or a flamethrower being used. Historical photographs (Figure 191) depict blackening to the walls and at the eastern entrance which could have been caused by an explosion induced fire or flamethrower activity.

Figure 190 - AB166: self-combusted and partially buried unfired 7.7mm ammunition

Figure 191 - AB166: eastern entrance and cave interior in 1944 and 2014

AB167 Radar Antenna Platform

The revolving cast and sheet metal antenna platform for the IJ radar array remains predominantly clear of vegetation on the top of Radar Hill. Small plants have begun to grow

through various holes and fracture points in the platform surface but otherwise the structure remains unchanged and in good, stable condition (Figure 192).

Figure 192 - AB167: IJ radar antenna platform in 2010 and 2014

Historical photographs recently acquired from NARA clearly depict the superstructure of the radar array collapsed to the sides of the antenna platform with smaller components strewn further down the hillside (Figure 193). A USMC photographic intelligence analysis of the Radar Hill radar describes it as a 'Guadalcanal Type' constructed of timber and angle iron. Comparison of the collapsed antenna in Figure 193 with the Guadalcanal example (Figure 194) would appear to confirm this interpretation as both antenna are of a similarly constructed triple dipole array with mattress type reflector. On the strength of these similarities, the radar installed at AB167 is most likely an IJN land-based Type 11 early warning radar. This type was also known as the Mk 1 Model 1 Type 2 and could detect surface contacts such as ships at 10 miles (16km) away, single aircraft at 75 miles (120km) and formations of aircraft at 155 miles (250km) (Budge 2013).

Figure 193 - Radar Hill with collapsed radar antenna

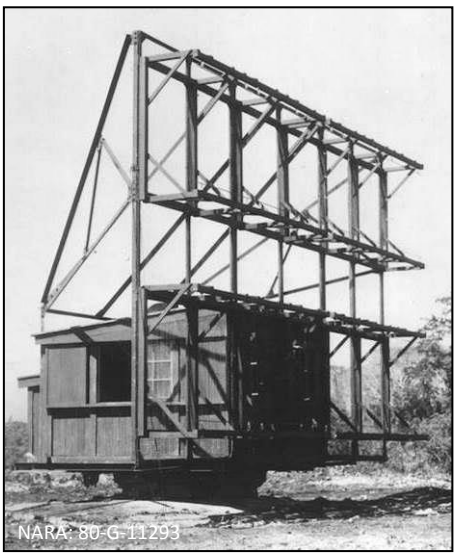


Figure 194 - 'Guadalcanal Type' radar

The very dense vegetation and precipitous slopes around the summit of Radar Hill prevented the investigation of a plateau to the north and just below the antenna which appears in historical photographs as being well fortified with US defensive fighting positions. Figure 195 depicts a 321st RCT rifle squad (12 men) in and around small coral rubble skirmisher trenches with improvised sun and rain shelter canopies; disabled radio communication equipment and wood and metal debris are visible around the positions and likely originated from the radar antenna. This image is particularly atmospheric not only for the dramatic views to the west in the background but also as it is one of few combat photographs showing squad members (most likely of *Baker* Company, 1st Bn, 321st RCT) smiling. Their expressions are understandable as they take in the rewarding views following two days of hard fighting which had involved crawling and climbing with ropes and ladders up the near vertical western face of the hill to reach and hold the summit of the highest peak on Peleliu (*ibid.*: 154). If suitable safety equipment were available and extensive vegetation cleared, a survey of the northern summit plateau would prove a beneficial future exercise for identifying and documenting the highest defensive fighting positions on the island.

Figure 195 - US defensive fighting positions on Radar Hill north plateau looking west

AB168 Japanese Fuel Storage Bunker/ WWII Museum

Structurally the site that now serves as the Peleliu WWII museum is in much better condition than it was in 2010. Large trees growing very close to the building which threatened to undermine the building foundations with their root systems have been cut down and other vegetation clinging to various facades appeared to be under control (Figure 196). Internally the site has undergone a major transformation with improved lighting, air conditioning and a tiled floor now installed. More superficial improvements such as freshly painted walls and increased general cleanliness are also apparent. Many of the artifacts on display are now contained within secured display cabinets offering valuable protection against petty theft, dust, dirt and other airborne corrosive contaminants (Figure 197). The hard work of the museum volunteers to improve conditions should be highly commended. Active corrosion of artifacts both in and outside display cases remains in evidence albeit at a less aggravated rate. This indicates that climate conditions (temperature and humidity) continue to fluctuate which is possibly a result of air conditioning being switched off occasionally. Artifacts have not yet been treated to stabilize their corrosion and a comprehensive conservation project is still highly recommended to safeguard the museum collection for future generations.

Figure 196 - AB168: tree removal since 2010

Figure 197 - AB168: improvements to artifact security and display since 2010

AB231 / AB14-108 Natural Cave Rock Shelter

The coral rubble revetment wall near the entrance to this natural cave was found to be intact during a resurvey of the site in 2014. The small, near vertical cave mouth (0.93x1.92m [HxW]) is also still partially blocked by fallen rubble material; however, a levelled area between the coral rubble wall and the cave mouth was far more clearly definable than four years earlier. An expended .45 cal cartridge case was found in this area suggesting that a M1A1 'Thompson' sub-machine gun had been fired from here, possibly into the cave. The cave entrance passage descends almost vertically for 1.65m before opening into a naturally formed, unimproved chamber of uneven walls, floor and ceiling (8.30x4.75x1.80m [LxWxH]). The lack of any form of improvement would suggest that the site may have served as a simple, improvised shelter for IJ personnel operating in the immediate area. The blackened canister of a US M15 WP smoke grenade was identified at the bottom of the entrance passage and may be in situ where it landed after being thrown down from the cave mouth during the battle. Notably, the IJ helmets and water canteens observed in 2010 are absent from the cave assemblage recorded in 2014 suggesting that the site has since been looted.

Artifacts Noted:
IJ field telephone components • US ammunition container • misc. metal fragments • expended US .45 cal cartridge case (in entrance) • large, hollow metal cylinder • metal chain links • US M15 WP smoke grenade

AB273 Improved Natural Cave - Vertical-Type - IJN Communications Centre

A visual inspection of AB273 revealed that the expansive natural cave had lost little of its vast artifact assemblage although material in the western entrance area has been moved. A cache of four drum magazines for a 20mm 'Oerlikon-type' canon have been added to a large stack of tubular metal framing at the northern end of the entrance area (Figure 198). Metal storage drums and electrical equipment which had been spread across the southern part of the area in 2010 has also been moved to create a clearing in front of the passage that leads into the main cave chamber. This activity likely dates to 2010 when the cave was used as a shelter during Typhoon Bopha. Artifacts and assemblages within the two cave chambers have witnessed far less disturbance although subtle adjustments to individual items is noticeable (Figure 199). The revisit in 2014 would suggest that although considerable deterioration of the cave artifact inventory is noticeable since 1944 (Figure 200), surviving objects have stayed within the site perimeter over the past four years and, for the best part, this material

has been relatively undisturbed despite the cave complex being a significant and often frequented battlefield site.

Figure 198 - AB273: stacked tubular scaffolding, with 20mm magazine additions in 2014

Figure 199 - AB273: cave 'B' bed and scaffold frame assemblage in 2010 & 2015

Figure 200 - AB273: southern part of cave 'A' showing artifact loss between 1944 and 2010

Section 4. Summary

4.0 General Summary

In 2010, the Peleliu Archeological Survey recorded 285 sites and features over approximately 590 acres of the battlefield which comprised the majority of the CCZ (which includes Death Valley and Wildcat Bowl) and the beach areas where the fighting was most intense. The 2014 survey covered a much smaller 95 acres of peripheral battlefield but still recorded 260 individual or clustered archeological sites and artifacts. 274 individual coordinate points were captured that relate to individual features or concentrations that form parts of these sites or assemblages. This is a very high density of archeology for a geographical area of battlefield 81% smaller than that surveyed in 2010. It is also worth considering that in The Horseshoe/Mortimer Valley where the jungle floor artifact survey was carried out, just under twice as many individual or grouped artifacts/macrofacts were recorded than sites (42 sites and 83 artifacts/macrofacts). If this ratio is consistent across other areas of the battlefield or at least within the CCZ then it is highly likely that the number of battlefield related 'sites' for areas such as Death Valley and Wildcat Bowl could almost double from those recorded in 2010. In the original bid to tender submitted to PWHS in April 2014, UoA estimated that as many as 100 previously unrecorded natural and artificial cave sites may exist within the 680 acre survey areas designated A and B. Although only 14% of that acreage was covered in 2014, 57 previously unrecorded natural and artificial cave sites were documented indicating that there could be well in excess of the estimated 100 caves surviving across the remaining 86% of Areas A and B.

The figures listed above speak for themselves and serve to illustrate the quantity and density of battlefield features that still exist on Peleliu today, not just in the dark depths of the many caves but also spread across the jungle floor. Generally speaking, site integrity, uniqueness of assemblage, quality of preservation and therefore level of obtainable archeological data was higher in more remote areas further away from the well beaten tracks and trails. However, sites of remarkable complexity and completeness were also found less than 50m away from the main population center of Kloulklubed. Even where disturbance was evident, sufficient data remained to interpret sites in detail. As it did in 2010, the nature of the material resource and the secrets it continually revealed about the personal battles as well as the larger actions continued to amaze and astound the UoA team in all areas investigated.

4.1 Assessment of Fieldwork Strategy

As encountered by US forces during the battle and by Denfeld and the authors since, the density of jungle vegetation, steep/rugged topography and lack of accurate maps form considerable challenges to navigation, movement and observation across the battlefield of Peleliu. Although slow-paced on account of these factors and the need to tread carefully behind an invaluable screen of demining experts, walkover survey remains one of the most effective means of assessing the battlefield and recording the sites, features and artifacts that survive, in detail. Inaccurate maps were found to drastically reduce the effectiveness of targeted walkover where transects were focused on specific landmarks or areas referred to in unit war diaries and battle accounts. The difficulty in finding the 321st Infantry Trail and associated Hill 100 are excellent examples as local knowledge of the area is vague (through a lack of exploration), satellite imagery only shows a thick jungle canopy and few common reference points exist between modern maps and historical tactical maps. If more accurate contour maps were available then walkover survey could be more effective and more efficient in targeting and, crucially, locating important battlefield landscape features on the ground. The implementation of a standardized recording procedure for sites using pro-forma recording forms proved highly effective for gathering detailed, comparable data for each site greatly aiding interpretation and connectivity between the archeology and the historical accounts as evidenced in the Section 3 site descriptions.

Measured cave survey represented a preliminary trial of an untested technique but it demonstrated its suitability as a lightweight, portable and accurate means of mapping caves and plotting the artifact scatters within them. Although heavier, more sophisticated digital techniques may have carried out the task quicker, the methods employed allowed for a detailed, illustrative assessment of the complex archeological deposits contained within cave sites using equipment that is more easily carried through the challenging terrain. The Laser Distance Measurer that was at the heart of the technique proved a highly effective and adaptable surveying device which was applied (with and without the tripod) to a range of survey tasks. The equipment also accomplished measuring applications normally undertaken by a Total Station such as logging the photogrammetry grid point positions at AB14-111.

Photomosaic recording approaches have potential use on Peleliu and proved effective on standing building elevations such as the AB14-107 air-raid shelter. However, initial field

experience in 2014 illustrated the difficulties of sustaining the necessary vertical perspective, even lighting and constant distance from the target for recording cave floors. Further development work and testing would be required to customize photogrammetric techniques to suit the unique challenges of Peleliu's caves and more success may be found in the future through exploring multi-image capture photo-modelling or laser scanning techniques.

4.2 Recommendations

4.2.1 Future Fieldwork

Detailed contour mapping and the production of maps combining historical and modern features is a necessity for any future work. Efforts have been made by Lindsay to rectify the cartographic accuracy issue through the production of a map using contour data compiled from 1945 aerial photography, taken when Peleliu's vegetation coverage was at its lowest following the deforesting effects of the battle (Appendix 8). This map offers a much improved depiction of the upland topography of Peleliu. It has already greatly assisted in the geographical information system (GIS) and tactical terrain analysis (KOCOA) aspects of this project as well as in the general interpretation of sites and how they relate to one another/the landscape. However, the map should not be considered definitive as it remains based on historic aerial photographic data. Airborne LiDAR offers the best means of achieving an accurate base map for Peleliu and would greatly assist any future work relating to the characterization, assessment or management of the battlefield. LiDAR could equally prove to be a very effective and powerful tool for preliminary site identification to inform targeted field survey.

Terrestrial LiDAR could equally warrant consideration as a means of mapping sites in greater detail, although sites would need to be carefully selected for this approach following a basic assessment of suitability and value. Ultimately, it is the opinion of the authors that a multifaceted approach combining manual methods of observing/recording the historic environment with digital techniques of measuring/depicting data are likely to produce the best interpretive results.

PAS'14 has shown that exceptional WWII archeology remains undiscovered in more remote areas of the battlefield and as a result further field survey is highly recommended to better

understand the nature of the fighting and assess the integrity of the archeological resource in less frequented geographies. Future survey work could be targeted at the following areas:

• **The South-West Omleblochel Hills & Ridges** - A series of hills and ridges to the south and west of Death Valley that were named by the 1st Marine Regt (including Hill 150, 160, 180, 200, 205, 210, 260 & 300) and became the main obstacles and objectives for their south-north advances during the first days of the invasion. It was assaulting these hills that inflicted the crippling losses that led to the withdrawal of the 1st Marine Regt from combat on Peleliu. Characterizing the archeological remains of the deadly engagements across this terrain should be considered key to understanding the plight of the 1st Marine Regt and the nature of the IJ defense in this area.

• **The Coral Badlands** - a long, thin, raised coralline limestone plateau between West Road and the Omleblochel extending from the foot of West Road to just south of the 321st Infantry Trail. This jumbled maze of mini-box canyons, ravines and crevices became notorious for the losses inflicted on the USMC by IJA snipers operating in this area.

• **The Upper Slopes and Summits of the 5 Brothers** - Fiercely contested, inaccessible strategic ground with great potential for undisturbed battle material offering insight into the desperate individual combatant engagements that were fought over this key, elevated terrain. Much of the 323rd RCT's early action on Peleliu was fought over this ground offering an opportunity to identify sites directly related to their role in the reduction of the CCZ.

• **Unnamed Ridge, Ridge 120, Wattie/Baldy Ridge, Ridge 3, Hill 140, Boyd Ridge, Keller-Miller Boulevard** - The 2010 survey identified a handful of sites in the lower ridges north of The Horseshoe/Mortimer Valley and south of 321st Infantry Trail but the upper elevations in this area remain unexplored. A more extensive and systematic survey of this critical area which witnessed the progressive drive south of the 321st RCT and 5th Marine Regt is recommended as part of any future walk over survey.

• **321st Infantry Trail & Hill 100** - Discoveries around Hill B and the South 100 Escarpment have revealed this to be an area of exceptional preservation worthy of more extensive

investigation. With a more accurate map now available and greater familiarity with the terrain, future exploration of this area could be very promising indeed.

• **Kamilianlul Mountains and Hill 80** - Referred to by this name in US historical texts and maps, this area encompasses the ridge area north of the 321st Infantry Trail that was secured fairly rapidly by the 321st RCT following the capture of Hill B. Although battlefield material is not anticipated to be dense, no previous survey work has been undertaken and, as such, it therefore warrants investigation. Hill 80 dominated the north end of East Road, was a target for the 5th Marine Regt prior to its assault on Hill Row and is known to have been a strong IJ defensive position containing a number of caves.

4.2.2 Future Archive Research

Historical records, maps, plans, photographs and textual documents have proved highly beneficial to informing fieldwork and site interpretation both in and out of the field and their value cannot be overstated. There still remain a great many documents, maps and plans at NARA and a further photographic source at USAHEC (pending declassification) to be reviewed and copied if PWHS wished to gather a full digital collection of Peleliu archive material. The PAS'14 visit to both archives endeavored to view as many Peleliu related catalogue entries as possible and summaries of those consulted have been included as part of appendices 1 and 2. These summaries do not represent an exhaustive search of all the potential sources of material at these archive repositories but it is hoped that they may provide an initial finding aid to guide future research efforts.

4.2.3 Future Online Education & Interpretation

If a positive outcome can be drawn from the ongoing disturbance and looting of WWII objects on Peleliu then it is the clear demonstration of a continuing, and potentially escalating, public interest in the battle and the remarkable material evidence from it that survives so prolifically across the island. There is, therefore, a distinct need to proactively engage with visitors and residents on Peleliu but also to educate and inform a global audience. The creation of an online resource or virtual museum could offer a forum for veterans, relatives, potential visitors, professional as well as amateur historians and other interested parties to learn more about Peleliu, the battle and the significance of the archaeological legacy from WWII that survives. A carefully managed web presence could

afford access to archive material, provide a balanced as well as accurate historical account of the battle and crucially emphasize the importance of preserving the archaeological resource in situ as an intrinsic component of the battlefield.

In addition to raising the international awareness of the archaeological legacy of WWII on Peleliu, such a web resource could offer the opportunity to encourage a better informed and more structured form of tourism. Interactive online material, downloadable site guides, walking trails and safety advice could be effectively used to direct visitors towards designated routes and sites, where they could experience the battlefield and its material remains safely with respect for those who lost their lives, the archeology, the natural environment and the residents of Peleliu.

The development of such a web-based resource should consider the following questions:

1. How will the website serve to preserve, protect and promote Peleliu's WWII heritage?
2. What are the principal objectives of the website? (e.g. education, research, public engagement, site preservation/data repository, commemoration, structured tourism);
3. What website format best serves these objectives? (e.g. interactive/map & app-driven, visual/photograph driven, text/archive document driven);
4. What information should be made available? (e.g. digitized copies of archive photographs & documents, archaeological site records, an interactive location map showing key battlefield landmarks to visit & recognized interpretive trails);
5. Who should be allowed to access the information presented? (e.g. use of a vetted site registration system for controlling access to certain areas of the website or particular resources);
6. How will the website be sustained long term? (e.g. how will it be funded, who will maintain & update it, will it be developed in phases).

The following recommendations should be considered when developing a web-based resource or virtual museum for the Battle of Peleliu:

- Consultation with government and professional-private stakeholders at local and global level (e.g. BAC, NPS, PWHS, UoA, CGD, local community representatives & relevant veteran associations) to identify and agree on the level and nature of information to be shared with the global audience via the website;

- Identification of a suitable website template that has the capacity to accommodate and deliver all of the principal objectives is very important. The ability to 'bolt-on' features such as interactive educational graphics, a secure members area, forum, interactive maps, video clips and user uploads & comments functions should be considered;
- Commissioned development of site guides, walking trails and safety advice for visitors and local residents in close cooperation with the aforementioned stakeholders to ensure consensus agreement on battlefield areas being made accessible;
- Secure copyright permission for use of any archive material being made available on the website and ensure that all sources are acknowledged with relevant citation meta-data attached to documents and photographs;
- Ensure that all necessary archaeological recording, ERW clearance, signage and infrastructure work has been completed prior to publishing or promoting any battlefield trails or guide material that can be used by members of the public to visit individual sites or locations.

Consideration should also be given to the limited, generally poor bandwidth and internet access available on Peleliu. These issues create a technologically limit the ability of islanders and visitors to engage with internet-based battlefield interpretation and research resources. Examples exist from other battlefield sites where such technological challenges have been overcome and virtual onsite interpretation successfully provided. At the 18th century battlefield of Culloden in Scotland, UK, a variety of scenarios were considered when developing and deploying a location based GIS mobile guidance experience. In three scenarios, a locally based WLAN network and web-server were suggested (Pfeifer *et al.* 2009: 53-54). Two of these scenarios did not require the WLAN (Wireless Local Area Network) to cover the full extent of the battlefield but still provided an effective means of transmitting interpretive audio-visual information to mobile devices carried by visitors (*ibid*.).

A similar arrangement could be explored on Peleliu with a WLAN intranet being established and managed from a suitable location (e.g. local museum, government or other stakeholder office). This arrangement could be App-based for compatibility with smartphones and tablet devices sharing a database containing the resources published on the internet website. In this way, local access, via personally owned web-capable devices, to interpretive materials, guides and research resources on the battle of Peleliu could be provided to residents and

visitors on Peleliu without the need for internet access. Expansion and further development of this system could include the managed provision of mobile devices to visitors as a form of battlefield experience guide similar to the system implemented at Culloden. Equally a number of fixed stations could be provided at publically accessible locations such as the Peleliu WWII Memorial Museum where members of the public without their own personal mobile devices could access, learn and conduct research using the digital resources

4.2.4 Future Public Engagement, Education and Local Involvement

In addition to the above mentioned virtual engagement with the public, any future work connected with WWII heritage on Peleliu should, wherever possible, seek to involve and inform the local island community. As discussed in Section 1.0.2, heritage resource and personal safety make open public participation in archeological fieldwork difficult, however, conversations with Peleliu resident members of the CGD team have demonstrated that WWII heritage is relevant, valued and of interest to younger generations of islanders. As an already highly skilled, professional and dedicated group, further involvement with CGD is strongly encouraged to build on the interest that exists within their staff. Through further archeological training CGD staff could be equipped with the skills and knowledge to record and manage the archeological landscape alongside their remit of making it safe through the removal of ERW. Alternatively, archeological skills training delivered in association with CGD could form the basis of a carefully monitored and managed community archeology group.

A broader scheme of engagement involving school visits, presentations, artifact handling sessions, exhibitions and organized site visits would also allow other members of the island community and visitors to 'rediscover' and interact with this period of island history. Organized events and activities such as these allow important messages to be delivered concerning heritage resource sustainability (i.e. retaining artifacts in situ), respecting the integrity of heritage sites and ERW risk awareness. Greater education and involvement therefore has the potential to change perceptions, make sites more relevant to people and instill a corporate sense of responsibility for maintaining and safeguarding heritage for the enjoyment and learning of future generations. Finally – and most crucially – carefully coordinated public engagement and involvement of this kind has the potential to create opportunities to introduce islanders to WWII sites as physical memory markers, share the

stories associated with those markers and consequentially offer scenarios in which identities can be asserted through connections to past places and people.

4.3 Concluding Remarks

This report has endeavored to summarize the results of a very successful scheme of archive research and field survey, and hopefully also serves to illustrate that every site on the battlefield has a story to tell which can be tied into and augmented by both American and Japanese historical accounts and personal reminiscences. By reconnecting sites with these narratives, a much greater understanding and depth of meaning can be attributed to each element of the battlefield. The past gains a more tangible voice through the archeological remains offering insight into the combatant experience and an opportunity to reflect on the horrors of battle - the barbarity in some cases - but also the strong sense of humanity: the challenges of staying alive and determination to prevail, the close bonds formed between men under such extreme conditions and the bravery of individuals often whilst aiding a comrade in danger. Therefore, in a very true sense this process encapsulates the cultural values of the chad ra Beliliou in terms of each object, site or place in the landscape serving as a memory marker and connection to past events. From apparently insignificant sections of angle iron to the most intact and elaborate cave complex, each site or object serves as a physical link not only to past events but to the stories of past individuals or groups that are unique to each location. Retention of context as a mean of facilitating the process of education, understanding, reflection and remembrance therefore cannot be underestimated.

The detail and insight gained from every site and artifact also serves to emphasize the contribution each item provides to understanding and interpreting the battle as a whole. It is therefore of utmost importance that the integrity of the sites and features be carefully preserved, managed and maintained. Revisiting sites surveyed in 2010 has revealed continued disturbance through looting practices and decay of remaining artifacts. In spite of this, resurvey has encouragingly demonstrated that disturbed sites have not been silenced and detailed information, sometimes relating to split second events, can still be recorded.

As is so often the case with conflict, an imbalance exists within many of the histories of the battle of Peleliu and with there being so few Japanese survivors this is perhaps understandable. However, aside from taphonomic and preservation factors, the

archeological record remains free from the political or numerical survival biases that afflict such confrontations. When combined with primary textual sources retrieved from archive repositories such as the USAHEC and NARA, in situ material evidence offers the opportunity to better understand the experiences of all sides of the conflict: US Army, US Marine Corps, Imperial Japanese and non-combatant laborers of other nations alike. PAS'14 has sought to readdress some of the imbalance with the combined archival and field archeological approaches presented in this report. It is hoped that through this process it has been demonstrated that even the smallest of sites or unassuming artifacts has the potential to contribute greatly to an impartial and multi-layered interpretation of a battle that witnessed some of the most horrific fighting in the Pacific theatre of operations during WWII.

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The authors would like to dedicate this report to the veterans of the battle of Peleliu and to the memory of all those who lost their lives or were physically or mentally maimed by the unimaginable horrors of the conflict that consumed the island in 1944. Peleliu's wartime heritage is their legacy to us, it tells the story of their bravery, perseverance through adversity and self-sacrifice. We hope that this archeological project and any future work or developments that span from it may serve as a fitting and long lasting tribute to their actions which can help to ensure that their story is not forgotten by future generations.

Appendices

Appendix 1. Sources Consulted at the US Army Heritage & Education Centre

Call Number	Title	Description	Copied
05-81 1948	81st Infantry Division Unit History	Full history of Division activity in WWII including maps & photos	IN FULL
10_B_1077	Allied Translator & Interpreter Section (ATIS) Documents	Translations of captured Japanese documents & maps relating to Peleliu garrison	IN FULL
10_B_2172	ATIS Documents	Translations of various captured documents including Palau garrison unit training Instructions	IN FULL
10_EP_52	ATIS Documents	Notes on Field Fortifications	IN PART
10_EP_275	ATIS Documents	Fortification Manual Part 2	IN PART
10_EP_393	ATIS Documents	Translations of captured Japanese cave construction plans of Woodpecker Ridge, Luzon	IN PART
10_IR_58	ATIS Documents	POW interrogation report	IN FULL
10_IR_59	ATIS Documents	POW interrogation report	IN FULL
302-710TK 1950	Armor in Angaur	Research report documenting history of 710th Tank Battalion during Operation Stalemate II	IN FULL
603-321 1945/4	321st RCT Unit History	Chronology, personnel medal citations, periodic reports and journal covering Peleliu period	IN FULL
ARCH COLL BOX 1	Paul J. Mueller Papers	Commendations	NO
ARCH COLL BOX 2	Paul J. Mueller Papers	Papers re: souvenirs issued Papers re: Division mascot 'Taffy' Medal citations for Angaur assault Copies of The Wildcat Newsletter, 1951 Papers re: battle casualties & burials Circumstances of death Letter template to next of kin Reply letters from next of kin Addresses of next of kin Angaur & Peleliu memorial dedications Cemetery list of the interred Account of chaplaincy activities Personnel Rosters	IN PART NO NO NO NO YES YES NO NO YES NO YES NO
ARCH COLL BOX 3	Paul J. Mueller Papers	Documents relating to Wildcat reunions, veterans' association, leaflets & correspondence in 3 folders. #1: Organization papers #2: Correspondents & letters #3: AIV papers referencing 1958 reunion	IN PART IN PART IN PART NO
ARCH COLL BOX 4	Paul J. Mueller Papers	General Orders 1942-1946 1942:1-21 Camp Rucker 1943:1-23 Camp Rucker & San Luis Obispo 1944:1-59 Camp San Luis Obispo, Various medal award lists. KIA list. 1944:60-142 Order of Battle, medal award citations 1945:1-69 medal award citations, lists of deaths, reorganization of units 1945:70-134 medal award citations, lists of relief personnel attached to units 1946 medal award citations & deactivation	IN PART NO NO NO IN PART NO NO NO

ARCH COLL BOX 5	Paul J. Mueller Papers	81st Infantry Division HQ & Special Troops Unit Histories 1942-1945. Containing within 26 subfolders.	
		#1: Signals Company (Coy) 1942-46	IN PART
		#2: HQ Coy 1942-45	YES
		#3: 781st Ordnance Maintenance Coy	YES
		#4: *No information*	NO
		#5: Division Band	IN PART
		#6: Military Police Platoon 1942-45	IN PART
		#7: 17th Field Hospital, 167th Evac. Hospital	YES
		#8: 81st Cavalry Reconnaissance Group	IN PART
		#9: HQ Special Troops & Medical Detachment 1942-45	YES
		#10: G-1 Section 1942-45	IN PART
		#11: G-2 Section (Intelligence) 1942-45	IN PART
		#12: G-3 Section 1942-45	IN PART
		#13: G-4 Section 1943-45	IN PART
		#14: Surgeons Office 1942-45	IN PART
		#15: Chief of Staff Section 1942-45	IN PART
		#16: Special Services Section 1942-45	YES
		#17: Division Engineers 1942-45	IN PART
		#18: Inspector General Section 1942-45	IN PART
		#19: Signals Section 1942-45	IN PART
		#20: Judge Advocate Section 1942-45	IN PART
		#21: Finance Section 1942-46	NO
		#22: Quartermaster Office 1942-45	IN PART
		#23: Public Relations Office 1945	NO
		#24: Adjutant General Section 1942-45	IN PART
		#25: Chaplains' Section 1942-45	YES
		#26: Ordnance Office 1942-45	YES
ARCH COLL BOX 6	Paul J. Mueller Papers	Orders & Plans for Angaur Operation	NO
		Admin. Orders 1944-45	NO
		Division S.O.P. 1945	NO
		Field Orders 1944-45	NO
		Misc. papers & maps 1944-45	NO
		Report of native population on Angaur including many photos	YES
ARCH COLL BOX 7	Paul J. Mueller Papers	Rosters of enlisted men, October 1945	NO
ARCH COLL BOX 8	Paul J. Mueller Papers	Rosters of Officers, NCOs & enlisted men Sept.1944-Dec.1945	NO
D735.S8 1994	Reports of General MacArthur Pt I & II	Selective parts of Vol 2 Part 2 with Japanese strategy and perspective of Peleliu campaign	IN PART
D735.w3713 1988 v.1	Wartime Translations of Seized Documents – Bibliography	Catalogue directory used to locate ATIS documents	RELEVANT SECTIONS
D735.w3713 1988 v.2	ATIS Indexes	Catalogue directory used to locate ATIS documents	RELEVANT SECTIONS
D769.37 1st.M3	The Old Breed	Illustrated history of 1st Marine Division in WWII	RELEVANT SECTIONS
D811.F84	Another Civilian Soldier	First-hand account of experiences on Angaur & Peleliu during WWII	RELEVANT SECTIONS
JM No.44-50	Japanese Monographs Reel 4: No 48	Historical record compiled by Japanese GHQ staff officers relating to Peleliu	IN FULL
JM No.44-50	Japanese Monographs Reel 4: No 49	Japanese historical account of events & activity leading up to and including battle of Peleliu	IN FULL
RG100s	Tredennick Photograph Collection	Aerial photos of Peleliu including detail of Central Combat Zone	IN FULL

RG454s	Paul J. Mueller Photograph Collection	Mixed photos taken after official end of hostilities on Peleliu	IN FULL
UA995.5.J64 no.103 v1	Joint Army Navy Intelligence Study of Palau Islands	Geographical intelligence information relating to Peleliu including maps & photos of phosphate mining infrastructure	IN PART
N/A	Warriors to the End	World War II Magazine article documenting the Japanese perspective on the Battle of Peleliu	IN FULL
N/A	WWII VETERAN SURVEY BOX 1	x17 surveys & memoirs returned by 81st Infantry Division veterans concerning their experiences during service in WWII	RELEVANT SECTIONS

Appendix 2. Sources Consulted at the US National Archives and Records Administration

The following list has been organized using the NARA citation system which should provide sufficient information to direct researchers to the relevant records. All references have been organized initially under the Record Group (RG) and subgroup. Individual entries then follow these headings with the box number and where relevant the file unit (folder within a box). A general description of the box content is offered with an indication of whether it has been copied or not. Textual records are listed first followed by photographic records. It should be noted that the RG80 series of photographic boxes contain a huge variety of photographs that do not relate to Peleliu and so where a box is described as being copied it refers to the Peleliu images within the box and not the box in its entirety.

Textual Records (including some maps & photographs) at College Park, MD			
Box #	**File Unit #**	**Contents Description**	**Copied**
RG38 RECORDS OF THE CHIEF OF NAVAL OPERATIONS			
Office of Naval Intelligence, POA Monograph Files, Area M – Carolines – Palau Is.			
56	-/-	Translated Japanese geographic files on Palau Is. Photographic intelligence report dated April 1943. Includes annotated map of Babelthuap	IN PART
57	-/-	Photographic reconnaissance reports with supporting maps and vertical aerial photographs	IN PART
WWII Action and Operational Reports			
787	-/-	Underwater Demolitions Teams 1 & 2. *No Peleliu references*	NO
788	1-44, 001	Underwater Demolitions Teams 3-6. *Copied UDT #6*	YES
789	006-44	Underwater Demolitions Teams 7-10. *Copied UDT#7*	YES
790	-/-	Underwater Demolitions Teams 10-17. *No Peleliu references*	NO
791	-/-	Underwater Demolitions Teams 17-26. *No Peleliu references*	NO
1570	-/-	81st Infantry Division Unit History & 'Action on Angaur' report	NO
RG127 RECORDS OF THE UNITED STATES MARINE CORPS			
Geographic 'Area' File 1942-46			
66	-/-	Operation & attack plans, Task Forces 32 & 33, cross-sections of beaches, annotated periscope photographs marking defenses	NO
67	-/-	3rd Fleet operational plans, drawings showing minefield around Palau	NO
68	-/-	Movement & bombardment orders, USMC special action report	NO
69	-/-	Naval gunfire reports, 3rd Fleet & III Amphibious Corps periodic reports	NO
Records relating to United States Marine Corps Operations in WWII (Geographic Files), Peleliu			
299	-/-	Hand written & typed daily journals/periodic reports from 1st Marine Regt's	NO
300	-/-	Action reports of 1st Marine Regt, Bn operational reports. *Copied sketch plan of Southern Ridges with hill numbers*	IN PART
301	A9-4	War diaries, combat/action reports, photographs of tactical relief model	IN PART
302	-/-	Operation Stalemate II operational plans, USS & LT action reports, UDT#6 report on mines	NO
303	-/-	Task Force 33 attack plan, movement orders, admin & training orders	NO
304	-/-	Island Command operation plan – *most relates to Yap*	NO
305	-/-	5th & 7th Marine Regt movement orders, Carrier Division 26 operational orders, 81st Infantry Division field orders for Angaur	NO

306	C1-2	Intelligence reports – guide to Pacific islands, ground defense force operational memorandum, 'Peleliu: Its Terrain & Defenses' report	IN PART
307	C1-3, C1-4	POW interrogation reports, captured documents & plans, diary of intelligence officer Capt. Flagg. Pre-invasion photographs of Peleliu	IN PART
308	-/-	Plans of Peleliu defenses based on pre-invasion aerial photographs, gunnery target trace maps. *Most of poor quality/resolution*	NO
RG313 RECORDS OF NAVAL OPERATING FORCES 'FLAG FILES'			
Records of Amphibious Forces			
107	A16-3	Report of Action: capture of Peleliu, October 1944. Part 1 and 2	NO
115	A16-3	3rd Amphibious Force - action report against Palau 1945	NO
117	A16-3	3rd Amphibious Force - report of action, seizure	NO
RG407 RECORDS OF THE ADJUTANT GENERAL'S OFFICE			
WWII Operations Reports 1940-48, 81st Infantry Division			
10380	381-INF (321)-0.3	Operation Report – Peleliu	NO
10381	381-INF (321)-0.7	Unit Journal – Peleliu Island Operation	NO
10384	381-INF (322)-0.3	Operation Report – Peleliu	NO
10390	381-INF (322)-0.3 & 0.10	Operation Report – Peleliu, photographs	IN PART
10391	381-INF (323) 7-0.3	Unit History - Company F, Peleliu	NO
Photographic Records from the Still Pictures Unit at College Park, MD			
RG80-G GENERAL RECORDS OF THE DEPARTMENT OF THE NAVY 1795-1947, General Photographs 1913-1945			
212	-/-	Aerials of Angaur, Malakal, Peleliu invasion landings	IN PART
213	-/-	Aerials of Peleliu invasion landings	IN PART
467	-/-	Contains only Angaur	NO
681	-/-	Contains only Angaur	NO
702	-/-	Contains only Angaur	NO
771	-/-	Mostly aerials of the landing beaches, some ground scenes	IN PART
772	-/-	Mostly aerials of southern Peleliu, some ground scenes	IN PART
773	-/-	IJ Tanks, USMC burials/casualties, defenses	IN PART
825	-/-	USMC wounded evacuation, various troop movements	IN PART
826	-/-	Naval bombardments and assault waves	IN PART
827	-/-	Naval bombardments and UDT activities	IN PART
828	-/-	Naval bombardments and UDT activities	IN PART
919	-/-	High altitude aerials and low resolution photograph of target map	IN PART
952	-/-	Naval bombardments and USMC wounded evacuation	IN PART
953	-/-	Assault as seen from the air and capital ships	IN PART
956	-/-	Aerials of Central Combat Zone	IN PART
957	-/-	Various of Marines ashore	IN PART
971	-/-	Pre-Invasion oblique aerial photographs and assault from capital ships	IN PART
972	-/-	Pre and invasion oblique aerial photographs	IN PART
973	-/-	Naval bombardments, aerials and UDT activities	IN PART
974	-/-	USMC wounded and various of Marines on Peleliu	IN PART
975	-/-	Oblique & vertical aerials of airfield, northern Peleliu & Ngedebus	IN PART
984	-/-	Oblique aerials of Central Combat Zone	IN PART
985	-/-	Oblique aerials of bombing on northern Palau Islands, supplies unloaded on Peleliu & wounded evacuation	IN PART

1017	-/-	Oblique aerials of Peleliu & Ngedebus, caves, field fortifications, pillboxes, IJ mines, captured artillery	IN PART
1018	-/-	Panoramas of west site of The Horseshoe/Mortimer Valley, field fortifications, pillboxes & casemates	IN PART
1049	-/-	Oblique aerials of invasion beaches & airfield complex	IN PART
1050	-/-	No Peleliu content identified	NO
1079	-/-	USMC various named individuals & groups	IN PART
1335	-/-	Oblique aerials of pre-invasion bombing	IN PART
1627	-/-	USMC personnel installing telephone lines & digging graves in cemetery	IN PART
1656	-/-	Low level oblique aerials of north & south Peleliu, USMC air wing, wounded evacuation, Marines KIA, POWs	IN PART
RG111-SC RECORDS OF THE OFFICE OF THE CHIEF SIGNAL OFFICER, Photographs: Signal Corps Photographs of American Activity 1900-1981			
542	-/-	Radar hill, armor, individuals & groups of USMC & Army personnel	IN PART
RG127-GW RECORDS OF THE UNITED STATES MARINE CORPS, Prints: Marine Corps Activities During WWII 1941-1958, Peleliu			
43	694	Administrative	IN PART
43	695	Aerials	YES
43	696	Airfields	YES
43	697	Air Strikes	YES
43	698	Ammunition and Explosive Ordnance	YES
43	699	Amphibious Vehicles	YES
43	700	Animals	IN PART
43	701	Anti-Aircraft Guns	IN PART
43	702	Army (WACS)	IN PART
43	703	Artillery	YES
43	704	Beach Scenes	IN PART
43	705	Briefing and Map Readings	IN PART
43	706	Fighters	IN PART
43	707	Medical Evacuation	NO
43	708	Observation	NO
43	709	Pilots and Crewmen	IN PART
43	710	Scout, Torpedo Bombers	IN PART
44	711	Transports	IN PART
44	712	Combat Photography and Correspondents	IN PART
44	713	Command and Observation Posts	IN PART
44	714	Communications	YES
44	715	Construction (Engineers)	IN PART
44	716	Damaged	YES
44	717	Dead Japanese	YES
44	718	Dead Marines	YES
44	719	Explosions, Fires	YES
44	720	Flag Raising	NO
44	721	Food	IN PART
44	722	Foxholes and Defenses	YES
44	723	Groups and Individuals	IN PART
44	724	Heavy Equipment	IN PART
44	725	Insect Control	IN PART
45	726	Intelligence, Interpreters	IN PART

45	727	Medical Evacuation of Wounded	IN PART
45	728	Mortars	YES
45	729	Japanese Gun Emplacements, Structures, Defenses (Pt.1)	YES
46	729	Japanese Gun Emplacements, Structures, Defenses (Pt.2)	YES
46	730	Japanese Soldiers	IN PART
46	731	Koreans	YES
46	732	Machine Guns	YES
46	733	Mail	YES
46	734	Medical	IN PART
46	735	Buildings, Campsites, Coral Casino	IN PART
46	736	Captured Supplies, Equipment, Weapons etc	YES
46	737	Cemeteries and Gravesites	YES
47	738	Ceremonies, Decorations, Awards	IN PART
47	739	Combat (Troop Movement)	YES
47	740	Natives	IN PART
47	741	Negro Seabees	IN PART
47	742	Officers and Officials – Inspections, Tours, Visits	IN PART
47	743	Palau, Angaur	IN PART
47	744	Palau, Babelthuap	IN PART
47	745	Palau Islands, Koror	IN PART
47	746	Palau Islands, Malakal	IN PART
47	747	Palau, Ngedebus Island	IN PART
47	748	Personal Hygiene	IN PART
47	749	Radar	NO
47	750	Recreation and Entertainment	IN PART
47	751	Relaxation	IN PART
47	752	Religion	IN PART
47	753	Repair and Maintenance	IN PART
47	754	Roads and Highways	IN PART
47	755	Rocket Launcher	YES
47	756	Signs	IN PART
47	757	Supplies and Equipment	IN PART
48	758	Surrender (see Malakal Island also)	IN PART
48	759	Tanks	YES
48	760	Terrain	YES
48	761	Vehicles	YES
48	762	Vessels and Landing Craft	YES
48	763	Water, Water Purification	YES
48	764	Weapons	YES
48	765	Kodachrome – Palau, Peleliu	YES
RG208-AA OFFICE OF WAR INFORMATION, Prints: Allies and Axis 1942-1945, AEF-Pacific Islands – New Guinea-Hollandia-Souvenirs to Palau-Angaur-Infantry			
72	LLL	Embarkation on Pavuvu	YES
72	MMM	Peleliu – action on the beach	YES
72	NNN	Task Force air cover near Peleliu	YES
72	PPP	Examination of Palauans on Garakayo Island	YES
72	QQQ	Peleliu – landing on the beach	YES
72	SSS	Peleliu – Marine taking a momentary rest	YES

72	TTT	Peleliu – wounded evacuation	YES
72	UUU	Angaur – US flag raised on the beach	IN PART
72	ZZZ	Angaur – signage	IN PART
73	A	Angaur – Landing Operations	IN PART
73	E-1	Peleliu various	YES
73	E-2	Peleliu various	YES
73	F-2	Peleliu – Air – Crews	YES
73	F-3	Peleliu – Ground Service	YES
73	G	Peleliu – Artillery	YES
73	H-1	Peleliu – Casualties	YES
73	H-2	Peleliu – Casualties (Naval)	YES
73	K	Peleliu – Command	IN PART
73	L	Peleliu – Communications	YES
73	M	Peleliu – Engineers	YES
73	N	Peleliu – Food	YES
73	P	Peleliu – Goodwill	YES
73	Q	Peleliu – Army Infantry	YES
73	S	Peleliu – Mail	YES
73	T	Peleliu – Chart Operations	IN PART
73	U	Peleliu – Mechanized	YES
73	V	Peleliu – Medical	YES
74	A	Peleliu – Naval	IN PART
74	B	Peleliu – Pets	YES
74	C	Peleliu – Relaxation	YES
74	D	Peleliu – Religion	YES
74	F	Peleliu – Souvenirs	YES
74	G	Peleliu – Supply	YES
74	H	Peleliu – Supply (Air-planes)	YES
74	J	Peleliu – Supply (Landing Operations)	YES
74	K	Peleliu – Transport	YES
74	L	Peleliu – Wounded	YES
74	M	Peleliu – Wounded Evacuation	YES
74	N	Peleliu – Wounded Evacuation (Air)	YES
261	-/-	Japanese losses (Personnel)	IN PART
262	GG, QQ, RR	Japanese losses – structures, weapons & fortifications	IN PART
267	FF, H, J, MM	Japanese losses – tanks & reinforcement barges	IN PART
282	M, S, T, U, V	Oblique aerials of Peleliu during assault & bombing of Malakal Island	IN PART
285	FF, GG, HH	Angaur native rehabilitation, IJ anti-aircraft emplacement & internment camp on Peleliu	IN PART
312	-/-	Japanese POWs	IN PART

Appendix 3. Site & Cave Recording Forms

Peleliu Archaeological Survey
Site Record Sheet

Site Code:	Site Name:	Site No:
Site Type:	Location:	

Previously Noted?	Denfeld 1988:	PAS 2010:	BAC:	CGD:

Site Coordinates: *(for points, lines and polygons)*

Point ID	Easting	Northing	Height	Point Description	Type

Physical Relationships:	Associated With:

Length: (m)	Width: (m)	Height / Depth: (m)

Description / Interpretation:

Sketch Plan:

Include other landmarks, hachures, dimensions, annotation

PTO?

Site Code:	Site Name:	Site No:

Additional Description / Interpretation:

Cave Interior Floor Plan Sketch:

Include other landmarks, hachures, dimensions, annotation

Photo No: *(camera,image)*	Drawing / Plan / Section No:
Site Significance: High Medium Low	Site Condition: Excellent Good Fair Poor
Site Disturbance: High Medium Low	Initials: / Date:

Peleliu Archaeological Survey
Cave Record Sheet

Site Code:	Site Name:	Location:	Site No:

Site Coordinates: *(points taken at openings)*

Point ID	Easting	Northing	Height	Point Description

Previously Noted?	Denfeld 1988:	PAS 2010:	BAC:	CGD:

Cave Classification: *(tick)*

NATURAL	*Varied size & location with no modifications or refinements*			
IMPROVED NATURAL	'Water Cavity'	'Balcony'	'Vertical Fault'	
ARTIFICIAL (NAVY)	H-Type	E-Type	U-Type	Y-Type
	I-Type	L-Type	T-Type	Rectangular
ARTIFICIAL (ARMY)	I-Type	L-Type	T-Type	U-Type
	W-Type	J-Type	Y-Type (a)	Y-Type (b)

Physical Relationships / Access: *(to other caves)*	Associated With:

Cave Access Points:

No. of Openings:	Main Entrance Sketch Plan / Elevation:
Main Entrance HxW: *(m)*	
Main Entrance Facing:	
Main Entrance Features: *(circle)*	
Flat area / steep downward inner slope	
Revetment: stone metal drums earth/rubble	
Prepared Defences: FG HMG LMG Mortar	

Description: *(include any associated artefacts, detail of other openings)*

Cave Interior:

Description of Layout: *(include artefact distribution, notable features etc)*

No. of Niches:	Main Passage LxWxH: *(m)*	Main Chamber LxWxH: *(m)*

Principal Artefact Types Present: *(circle)*

Human Remains	IJA Respirator	IJN Respirator	IJ Canteen	IJ Combat Kit	IJ Container
IJ Furniture	IJ Glassware	IJ Helmet	IJ Medical Kit	IJ Mess Tin	IJ Personal Kit
IJ Porcelain	IJ Provisions	IJ SMA	IJ Technical	IJ UXO	IJ Weaponry
US Canteen	US Combat Kit	US Container	US Helmet	US Medical Kit	US Mess Tin
US Personal Kit	US Provisions	US SMA	US Technical	US UXO	US Weaponry

Additional Artefacts Present: *(or further detail on artefacts listed, types etc)*

Site Code:	Site Name:	Site No:

Additional Description / Interpretation:

Cave Interior Floor Plan Sketch:

Include other landmarks, hachures, dimensions, annotation

Photo No: *(camera,image)*	Drawing / Plan / Section No:
Site Significance: High Medium Low	Site Condition: Excellent Good Fair Poor
Site Disturbance: High Medium Low	Initials: / Date:

Appendix 4. AB14-058 Measured Cave Survey

#4

#5

#6

#7

#3

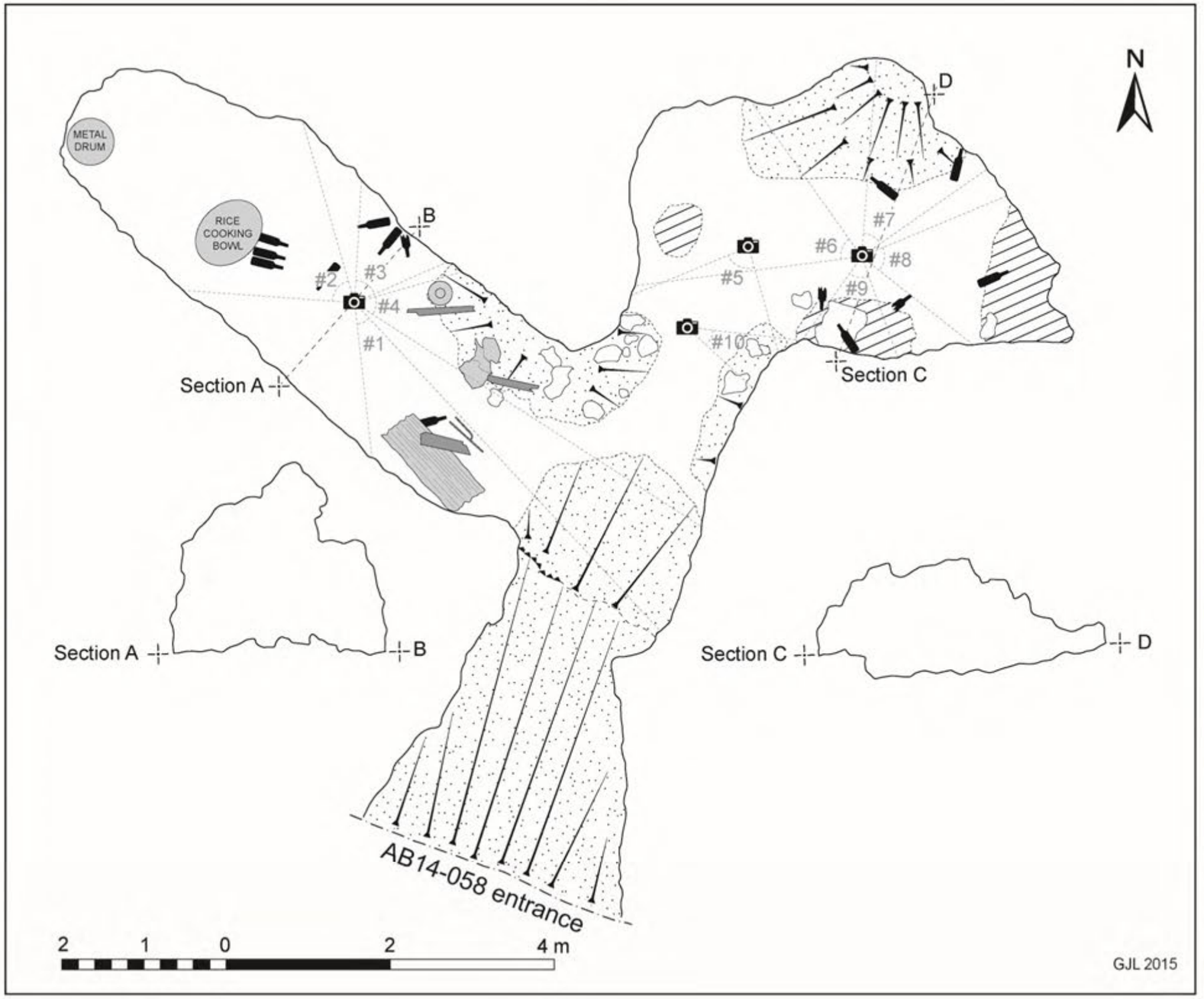
#8

#2

#9

#1

#10



Appendix 5. AB14-111 Storage Cave Floor Mosaic

Appendix 6. PAS'14 Sites Register (Public Access Version)

PAS'14 Site #	Previous Site #	Site Description	Area
AB14-001	New Site	Palauan Shell Midden	HILL 300
AB14-002A	New Site	Palauan Shell Midden - centered on downslope spread into Horseshoe	HILL100/WALT/ POPE RIDGE
AB14-002B	New Site	Palauan Shell Midden - centered on spread at top of Hill100/Walt/Pope Ridge	HILL100/WALT/ POPE RIDGE
AB14-002C	New Site	Palauan Shell Midden - visible concentration along Walt/Pope Ridge	HILL100/WALT/ POPE RIDGE
AB14-002D	New Site	Palauan Shell Midden - pottery scatter exposed by tree throw	HILL100/WALT/ POPE RIDGE
AB14-003A	New Site	TBM-1C Avenger 16956 Crash Site - undercarriage leg	HILL100/WALT/ POPE RIDGE
AB14-003B	New Site	TBM-1C Avenger 16956 Crash Site - engine block & propeller	HILL100/WALT/ POPE RIDGE
AB14-004	New Site	IJ Ordnance - 250kg aerial bomb high explosive filler	HILL100/WALT/ POPE RIDGE
AB14-005	New Site	Defensive Fighting Position - crescent coral rifle pit	HILL100/WALT/ POPE RIDGE
AB14-006	New Site	US Defensive Fighting Position - rectangular coral skirmisher trench	HILL100/WALT/ POPE RIDGE
AB14-007	New Site	US Defensive Fighting Position - square coral skirmisher trench	HILL100/WALT/ POPE RIDGE
AB14-008	New Site	TBM-1C Avenger 16956 Port Wing Aileron	HILL100/WALT/ POPE RIDGE
AB14-009	New Site	IJ Mortar Platform	HILL100/WALT/ POPE RIDGE
AB14-010A	New Site	Artificial Cave (Army Y-type (a)) - primary/combat entrance	HORSESHOE/ MORTIMER VALLEY
AB14-010B	New Site	Artificial Cave (Army Y-type (a)) - tertiary/mortar position entrance	HORSESHOE/ MORTIMER VALLEY
AB14-010C	CGD/JBC/ 022 (CGD)	Artificial Cave (Army Y-type (a)) - secondary/personnel entrance	HORSESHOE/ MORTIMER VALLEY
AB14-011A	New Site	Artificial Cave (Army I-type) - entrance	HORSESHOE/ MORTIMER VALLEY
AB14-011B	New Site	IJ Food Carrier - located between AB14-011 & 012	HORSESHOE/ MORTIMER VALLEY
AB14-012	New Site	Artificial Cave (Army I-type) - entrance	HORSESHOE/ MORTIMER VALLEY
AB14-013A	New Site	Artificial Cave (Navy I-type) - slight coral revetment	HORSESHOE/ MORTIMER VALLEY
AB14-013B	New Site	USMC Jerry Can - near cave entrance	HORSESHOE/ MORTIMER VALLEY
AB14-014	New Site	Palauan Shell Midden - centered on large spread at cave entrance	HORSESHOE/ MORTIMER VALLEY
AB14-015	New Site	Artificial Cave (Army I-type) - 75mm projectiles imbedded in rear wall	HORSESHOE/ MORTIMER VALLEY
AB14-016	New Site	Artificial Cave (Army I-type) - entrance	HORSESHOE/ MORTIMER VALLEY
AB14-017A	New Site	Artificial Cave (Navy I-type) - metal drum revetment	HORSESHOE/ MORTIMER VALLEY
AB14-017B	New Site	F4U Corsair Drop Tank - mounting bracket	HORSESHOE/ MORTIMER VALLEY

AB14-017C	New Site	US Defensive Fighting Position - square skirmisher trench	HORSESHOE/ MORTIMER VALLEY
AB14-018	New Site	US Barbed High Wire Entanglement - 3 row angle iron pickets & wire	HORSESHOE/ MORTIMER VALLEY
AB14-019	New Site	Sealed Cave - rubble collapse	HORSESHOE/ MORTIMER VALLEY
AB14-020	New Site	Palauan Shell Midden - containing distal end of tibia	HORSESHOE/ MORTIMER VALLEY
AB14-021A	New Site	Artificial Cave (Army U-type) - combat entrance	HORSESHOE/ MORTIMER VALLEY
AB14-021B	New Site	Artificial Cave (Army U-type) - personnel entrance	HORSESHOE/ MORTIMER VALLEY
AB14-022A	New Site	IJ Defensive Strong Point - central point at metal drum between B & C	HORSESHOE/ MORTIMER VALLEY
AB14-022B	New Site	IJ Defensive Fighting Position - westerly rock-cut covered 'pillbox-type' rifle pit with TBM-1C Avenger 16956 wing tip	HORSESHOE/ MORTIMER VALLEY
AB14-022C	New Site	IJ Defensive Fighting Position - easterly rock-cut covered 'pillbox-type' rifle pit	HORSESHOE/ MORTIMER VALLEY
AB14-023	New Site	IJ Defensive Fighting Position - rock-cut covered 'pillbox-type' rifle pit	HORSESHOE/ MORTIMER VALLEY
AB14-024	New Site	Artificial Cave (Army U-type) - dug into large natural vertical fault	HORSESHOE/ MORTIMER VALLEY
AB14-025A	New Site	Artificial Cave (Army Improved U-type) - combat entrance	HORSESHOE/ MORTIMER VALLEY
AB14-025B	New Site	Artificial Cave (Army Improved U-type) - personnel entrance	HORSESHOE/ MORTIMER VALLEY
AB14-025C	New Site	Artificial Cave (Army Improved U-type) - compacted rubble mortar platform	HORSESHOE/ MORTIMER VALLEY
AB14-026	New Site	Improved Natural Cave (Vertical Fault) - large caliber artillery position	HORSESHOE/ MORTIMER VALLEY
AB14-027	New Site	Natural Cave Rock Shelter - improvised fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-028	New Site	Artificial Cave (Army I-type) - entrance	HORSESHOE/ MORTIMER VALLEY
AB14-029	New Site	Improved Natural Cave (Vertical Fault) - expanded to Army L-type	HORSESHOE/ MORTIMER VALLEY
AB14-030A	New Site	Natural Cave Rock Shelter - improvised fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-030B	New Site	IJ Water Cistern - rectangular near rock shelter	HORSESHOE/ MORTIMER VALLEY
AB14-030C	New Site	IJ Water Cistern - square near rock shelter	HORSESHOE/ MORTIMER VALLEY
AB14-031	New Site	Artificial Cave (L-type) - entrance	HORSESHOE/ MORTIMER VALLEY
AB14-032A	New Site	Caisson Assemblage - 37mm type 94 caisson	HORSESHOE/ MORTIMER VALLEY
AB14-032B	New Site	Caisson Assemblage - 37mm type 94 caisson with spares/tool kits	HORSESHOE/ MORTIMER VALLEY
AB14-032C	New Site	Caisson Assemblage - 37mm timber spoked type	HORSESHOE/ MORTIMER VALLEY
AB14-032D	New Site	Caisson Assemblage - 37mm type 94 caisson	HORSESHOE/ MORTIMER VALLEY
AB14-033A	New Site	Artificial Cave (Army U-type) - sealed combat entrance	HORSESHOE/ MORTIMER VALLEY
AB14-033B	New Site	Artificial Cave (Army U-type) - sealed personnel entrance	HORSESHOE/ MORTIMER VALLEY

AB14-034	New Site	Natural Cave Rock Shelter - improvised fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-035	New Site	Phosphate Mining Pit	HORSESHOE/ MORTIMER VALLEY
AB14-036A	New Site	IJ Defensive Fighting Position - improvised, metal drum revetment rock shelter	HORSESHOE/ MORTIMER VALLEY
AB14-036B	New Site	US Mortar Bomb Fragment Spread - near rock shelter	HORSESHOE/ MORTIMER VALLEY
AB14-036C	New Site	Fragment of Armor Plate - near rock shelter	HORSESHOE/ MORTIMER VALLEY
AB14-037A	New Site	Material Assemblage - IJ water pumping engine	HORSESHOE/ MORTIMER VALLEY
AB14-037B	New Site	Material Assemblage - IJ metal caisson/limber wheel rims	HORSESHOE/ MORTIMER VALLEY
AB14-037C	New Site	Material Assemblage - US 60 & 81mm mortar bomb tail fin assemblies, x2 IJ 75mm projectiles	HORSESHOE/ MORTIMER VALLEY
AB14-037D	New Site	Material Assemblage - US 60 & 81mm mortar bomb tail fin assemblies, x1 IJ 70mm projectile	HORSESHOE/ MORTIMER VALLEY
AB14-037E	New Site	Material Assemblage - IJ collapsible hand cart	HORSESHOE/ MORTIMER VALLEY
AB14-038A	AB126 (PAS'10)	IJ 70mm Type 92 Battalion Gun	WILDCAT BOWL
AB14-038B	New Site	Material Assemblage - IJ caisson/limber wheel rims & 70mm ammunition containers	HORSESHOE/ MORTIMER VALLEY
AB14-038C	New Site	Material Assemblage - US M140A1 packing containers & railway sleeper clamps	HORSESHOE/ MORTIMER VALLEY
AB14-039A	New Site	Natural Cave Rock Shelter - improvised fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-039B	New Site	Narrow Ledge Railway Cutting & Track - near to Rock Shelter	HORSESHOE/ MORTIMER VALLEY
AB14-040	New Site	Natural Cave Rock Shelter - improvised Army I-type fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-041	New Site	Natural Cave - improvised fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-042A	New Site	IJ Battery Wagon Caisson - near complete wooden spoke type	HORSESHOE/ MORTIMER VALLEY
AB14-042B	New Site	IJ Battery Wagon Limber - associated with 042A caisson	HORSESHOE/ MORTIMER VALLEY
AB14-043	New Site	Natural Cave Rock Shelter	HORSESHOE/ MORTIMER VALLEY
AB14-044A	New Site	Artificial Cave (Navy U-type) - combat entrance	HORSESHOE/ MORTIMER VALLEY
AB14-044B	New Site	Artificial Cave (Navy U-type) – personnel/escape entrance	HORSESHOE/ MORTIMER VALLEY
AB14-045	New Site	Natural Cave Rock Shelter - improvised balcony-type fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-046	New Site	Natural Cave Rock Shelter - improvised fighting position	HORSESHOE/ MORTIMER VALLEY
AB14-047A	New Site	Narrow Ledge Railway Cutting - northern visible extent	HORSESHOE/ MORTIMER VALLEY
AB14-047B	New Site	Single metal rail visible between 47A & 47C	HORSESHOE/ MORTIMER VALLEY
AB14-047C	New Site	Narrow Ledge Railway Cutting - southern visible extent	HORSESHOE/ MORTIMER VALLEY
AB14-048	New Site	IJ Defensive Fighting Position - earth & coral rubble parapet	HORSESHOE/ MORTIMER VALLEY

AB14-049	New Site	Palauan Shell Midden - visible along scarp slope	HORSESHOE/ MORTIMER VALLEY
AB14-050	New Site	IJ Defensive Fighting Position - forward observation post	HORSESHOE/ MORTIMER VALLEY
AB14-051	New Site	IJ Field Gun Emplacement - with 75mm Type 95 Field Gun	HILL ROW #1
AB14-052	New Site	Artificial Cave (Army Y-type (a)) - support, ammunition storage for 75mm guns	HILL ROW #1
AB14-053	New Site	IJ Field Gun Emplacement - timber revetment casemate	HILL ROW #1
AB14-054A	New Site	Improved Natural Cave (balcony-type) - main entrance	HILL ROW #1
AB14-054B	New Site	Improved Natural Cave (balcony-type) - barricaded entrance, mortar platform	HILL ROW #1
AB14-055A	New Site	Improved Natural Cave (balcony-type) - primary northern entrance	HILL ROW #1
AB14-055B	New Site	Improved Natural Cave (balcony-type) - small escape entrance	HILL ROW #1
AB14-055C	New Site	Improved Natural Cave (balcony-type) - secondary southern entrance	HILL ROW #1
AB14-056	New Site	Artificial Cave (Army U-type) - personnel entrance	HILL ROW #1
AB14-057	New Site	Natural Cave Rock Shelter - improvised fighting position	HILL ROW #1
AB14-058	New Site	Artificial Cave (Army Y-type (b)) - combat entrance	HILL ROW #1
AB14-059A	New Site	Destroyed Improved Natural Cave - access to Y-shaped cave	HILL ROW #1
AB14-059B	New Site	Destroyed Improved Natural Cave - access to Y-shaped cave	HILL ROW #1
AB14-059C	New Site	Destroyed Improved Natural Cave - access to S-shaped cave	HILL ROW #1
AB14-059D	New Site	Destroyed Improved Natural Cave - rock shelter recess	HILL ROW #1
AB14-060	New Site	Artificial Cave (I-type) - coral revetment at entrance	HILL ROW #1
AB14-061	New Site	Improved Natural Cave Rock Shelter - improvised coral revetment fighting position	HILL ROW #1
AB14-062A	New Site	US Defensive Fighting Position - rectangular coral LMG/HMG emplacement	HILL ROW #1
AB14-062B	New Site	Possible Bomb Crater with possible US Defensive Fighting Position	HILL ROW #1
AB14-062C	New Site	US Defensive Fighting Position - circular coral skirmisher trench	HILL ROW #1
AB14-062D	New Site	US Defensive Fighting Position - circular coral skirmisher trench	HILL ROW #1
AB14-062E	New Site	US Defensive Fighting Position - rectangular coral LMG/HMG emplacement	HILL ROW #1
AB14-062F	New Site	US Defensive Fighting Position - square coral LMG/HMG emplacement	HILL ROW #1
AB14-063	New Site	Artificial Cave (Army L-type) - revetment at entrance	HILL ROW #1
AB14-064A	New Site	Improved Natural Cave - entrance	HILL ROW #1
AB14-064B	New Site	IJ Defensive Fighting Position - improvised coral revetment fighting position	HILL ROW #1
AB14-065	New Site	Natural Cave - freshwater lake	CHEMIANGEL
AB14-066	New Site	Standing Building - small, concrete single room structure	CHEMIANGEL
AB14-067	New Site	Possible Defensive Fighting Position - rock-cut, partially destroyed	CHEMIANGEL
AB14-068	New Site	Improved Natural Cave (balcony-type) - accessible entrance	CHEMIANGEL
AB14-069	New Site	IJ Defensive Fighting Position - rock-cut with coral rubble parapet	CHEMIANGEL
AB14-070	New Site	IJ Defensive Fighting Position - rock-cut	CHEMIANGEL

AB14-071A	New Site	Artificial Cave (Army J- type) - entrance	CHEMIANGEL
AB14-071B	New Site	Improved Natural Cave Rock Shelter - sniper position with loop hole	CHEMIANGEL
AB14-072	New Site	Concrete Foundations - related to phosphate mining activity	CHEMIANGEL
AB14-073	New Site	US Defensive Fighting Position - square coral skirmisher trench	HILL ROW #1
AB14-074A	New Site	US Defensive Fighting Position - oval coral skirmisher trench	HILL ROW #1
AB14-074B	New Site	US Defensive Fighting Position - oval coral skirmisher trench	HILL ROW #1
AB14-075	New Site	Natural Cave Rock Shelter - improvised fighting position	HILL ROW #1
AB14-076A	New Site	IJ Defensive Strongpoint - main cave and trench complex	HILL ROW #2
AB14-076B	New Site	IJ Defensive Strongpoint - entrance to secondary cave	HILL ROW #2
AB14-076C	New Site	IJ Defensive Strongpoint - flat platform possibly field gun emplacement	HILL ROW #2
AB14-077A	New Site	US Defensive Fighting Position - horseshoe LMG/HMG emplacement	HILL ROW #2
AB14-077B	New Site	US Defensive Fighting Position - horseshoe LMG/HMG emplacement	HILL ROW #2
AB14-077C	New Site	US Defensive Fighting Position - horseshoe LMG/HMG emplacement	HILL ROW #2
AB14-077D	New Site	US Defensive Fighting Position - horseshoe LMG/HMG emplacement	HILL ROW #2
AB14-077E	New Site	US Defensive Fighting Position - rectangular coral skirmisher trench	HILL ROW #2
AB14-077F	New Site	US Defensive Fighting Position - L-shaped coral skirmisher trench	HILL ROW #2
AB14-077G	New Site	US Defensive Fighting Position - horseshoe LMG/HMG emplacement	HILL ROW #2
AB14-077H	New Site	US Defensive Fighting Position - possible CP	HILL ROW #2
AB14-078	New Site	Improved Natural Cave (possible balcony-type) - blocked inner passage	HILL ROW #2
AB14-079A	New Site	Bomb Crater	CHEMIANGEL
AB14-079B	New Site	Bomb Crater	CHEMIANGEL
AB14-080	New Site	Defensive Fighting Position - crescent coral rifle pit	CHEMIANGEL
AB14-081	New Site	IJ Observation Post - rectangular coral position	CHEMIANGEL
AB14-082	New Site	US Defensive Fighting Position - semi-circular coral skirmisher trench	CHEMIANGEL
AB14-083A	New Site	Defensive Fighting Position - coral outcrop semi-circular trench	CHEMIANGEL
AB14-083B	New Site	Defensive Fighting Position - square coral rifle pit	CHEMIANGEL
AB14-084	New Site	Defensive Fighting Position - crescent coral rifle pit	CHEMIANGEL
AB14-085	New Site	IJ Observation Post - partially rock-cut	CHEMIANGEL
AB14-086	New Site	IJ Improvised Defensive Fighting Position - fire trench	HILL ROW #3
AB14-087	New Site	Natural Cave Rock Shelter - improvised fighting position	HILL ROW #3
AB14-088	New Site	Natural Cave Rock Shelter - improvised fighting position	HILL ROW #3
AB14-089	New Site	Natural Cave Rock Shelter - improvised Army I-type fighting position	HILL ROW #3
AB14-090	New Site	Natural Cave Rock Shelter - largely destroyed	HILL ROW #3
AB14-091	New Site	US Defensive Fighting Position - c-shaped fire trench	321ST INFANTRY TRAIL
AB14-092A	New Site	US Defensive Fighting Position - possible Company (60mm) mortar emplacement	SOUTH 100 ESCARPMENT

AB14-092B	New Site	US Defensive Fighting Position - roughly rectangular coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092C	New Site	US Defensive Fighting Position - x2 coral skirmisher trenches	SOUTH 100 ESCARPMENT
AB14-092D	New Site	US Defensive Fighting Position - rectangular coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092E	New Site	US Defensive Fighting Position - oval coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092F	New Site	US Defensive Fighting Position - oval coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092G	New Site	US Defensive Fighting Position - circular coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092H	New Site	US Defensive Fighting Position - crescent coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092I	New Site	US Defensive Fighting Position - x3 coral skirmisher trenches	SOUTH 100 ESCARPMENT
AB14-092J	New Site	US Defensive Fighting Position - rectangular coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092K	New Site	US Defensive Fighting Position - crescent coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092L	New Site	US Defensive Fighting Position - L-shaped coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092M	New Site	US Defensive Fighting Position - c-shaped coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092N	New Site	US Defensive Fighting Position - rectangular coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092O	New Site	US Defensive Fighting Position - L-shaped coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092P	New Site	US Defensive Fighting Position - circular coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092Q	New Site	US Defensive Fighting Position - rectangular coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-092R	New Site	US Defensive Fighting Position - oval coral skirmisher trench	SOUTH 100 ESCARPMENT
AB14-093	New Site	Natural Cave - not accessed due to ERW threat	SOUTH 100 ESCARPMENT
AB14-094	New Site	Natural Cave - vertical entrance, multi-level chambers	SOUTH 100 ESCARPMENT
AB14-095	New Site	Natural Cave Rock Shelter - improvised fighting position	SOUTH 100 ESCARPMENT
AB14-096	New Site	Defensive Fighting Position - crescent coral skirmisher trench	HILL B
AB14-097	New Site	Defensive Fighting Position - crescent coral skirmisher trench	HILL B
AB14-098	New Site	Defensive Fighting Position - crescent coral skirmisher trench	HILL B
AB14-099	New Site	Defensive Fighting Position - square rock-cut possible mortar emplacement	HILL B
AB14-100	New Site	Natural Cave - personnel shelter	HILL B
AB14-101	New Site	Natural Cave Rock Shelter - 14th Division Tank Unit maintenance dispersal	HILL B
AB14-102	New Site	Natural Cave Rock Shelter - 14th Division Tank Unit ammunition dump	HILL B
AB14-103	New Site	Defensive Fighting Position - square rock-cut rifle pit	HILL B
AB14-104	New Site	Artificial Cave (Army U- type) - personnel entrance	UNNAMED RIDGE
AB14-105	New Site	IJ Concrete Anti-Tank Gun Casemate	HILL100/WALT/ POPE RIDGE

AB14-106	New Site	IJ Concrete Anti-Tank Gun Casemate - 37mm	AIRFIELD
AB14-107	23.1 (Denfeld), AB28 (PAS'10)	IJ Concrete Air-Raid Shelter	AIRFIELD
AB14-108	AB231 (PAS'14)	Natural Cave Rock Shelter - improvised fighting position	SOUTHERN RIDGES
AB14-109	New Site	Artificial Cave (Army I-type) - contains concrete-set MG mounting	SOUTHERN RIDGES
AB14-110	AB81 (PAS'10)	Artificial Cave (Navy H-type) - IJN secondary communications cave	WILDCAT BOWL
AB14-111	17 (Denfeld), AB145 (PAS'10)	Artificial Cave (Navy rectangular-type) - storage cave	SOUTHERN RIDGES
AB14-112	AB165 (PAS'10)	Artificial Cave (Navy I-type) - contains electrical gear	RADAR HILL
AB14-113	New Site	Japanese Pre-Battle Military Burial Ground	SOUTHERN RIDGES

Appendix 7. PAS'14 Small Finds Register (Public Access Version)

PAS'14 SF #	Site Description	Area
AB14-SF001	Disarticulated Human Remains - femur, tibia, rib & long bones	HORSESHOE/MORTIMER VALLEY
AB14-SF002	US 60mm M83A1 Illuminating Mortar Bomb Casing	HORSESHOE/MORTIMER VALLEY
AB14-SF003	US 105mm Projectile	HORSESHOE/MORTIMER VALLEY
AB14-SF004	Pick Axe Head & 81mm Mortar Bomb Casing Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF005	Tubular Pole, .50 cal Cartridge & x2 60mm M83A1 Illuminating Mortar Bomb Casings	HORSESHOE/MORTIMER VALLEY
AB14-SF006	US 60mm M83A1 Illuminating Mortar Bomb Fragments	HORSESHOE/MORTIMER VALLEY
AB14-SF007	IJ Mess Kit	HORSESHOE/MORTIMER VALLEY
AB14-SF008	IJ Mess Kit - flattened	HORSESHOE/MORTIMER VALLEY
AB14-SF009	US 60mm M83A1 Illuminating Mortar Bomb Fragments	HORSESHOE/MORTIMER VALLEY
AB14-SF010	US .30 Cal Ammo Box Lid & Corroded Large Caliber Projectile Fuse	HORSESHOE/MORTIMER VALLEY
AB14-SF011	US Large Caliber Projectile Shrapnel Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF012	US M1918A1/2 BAR Magazine - empty	HORSESHOE/MORTIMER VALLEY
AB14-SF013	US Caterpillar Tread Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF014	IJ Type 92 'Lewis-type' HMG Tripod	HORSESHOE/MORTIMER VALLEY
AB14-SF015	Improvised US Army Lighting Pylon Fragments	HORSESHOE/MORTIMER VALLEY
AB14-SF016	US Jerry Can	HORSESHOE/MORTIMER VALLEY
AB14-SF017	IJ Sewing Machine Flywheel	HORSESHOE/MORTIMER VALLEY
AB14-SF018	Possible IJ 50mm Type 10 Grenade Discharger Barrel	HORSESHOE/MORTIMER VALLEY
AB14-SF019	IJ Water Storage Cylinder	HORSESHOE/MORTIMER VALLEY
AB14-SF020	IJ Water Storage Cylinder - bullet riddled	HORSESHOE/MORTIMER VALLEY
AB14-SF021	US 60mm M83A1 Illuminating Mortar Bomb Casing	HORSESHOE/MORTIMER VALLEY
AB14-SF022	Metal Storage Drum	HORSESHOE/MORTIMER VALLEY
AB14-SF023	IJ LMG Bipod	HORSESHOE/MORTIMER VALLEY
AB14-SF024	x2 US 60mm M83A1 Illuminating Mortar Bomb Casings	HORSESHOE/MORTIMER VALLEY
AB14-SF025	US 60mm M83A1 Illuminating Mortar Bomb Casing	HORSESHOE/MORTIMER VALLEY
AB14-SF026	Rubber Tire & Metal Wheel Rim	HORSESHOE/MORTIMER VALLEY
AB14-SF027	Barbeque Cooker Stand	HORSESHOE/MORTIMER VALLEY
AB14-SF028	Barbeque Cooker	HORSESHOE/MORTIMER VALLEY
AB14-SF029	x7 IJ HMG Tripod Carrying Frame Components	HORSESHOE/MORTIMER VALLEY
AB14-SF030	IJ Water Filtration System Cylinder & Filters	HORSESHOE/MORTIMER VALLEY
AB14-SF031	Glass Bottle & Wheel	HORSESHOE/MORTIMER VALLEY
AB14-SF032	Metal Storage Drum - bullet riddled	HORSESHOE/MORTIMER VALLEY
AB14-SF033	IJ Cast Iron Water Pipe & Survey Marker	HORSESHOE/MORTIMER VALLEY
AB14-SF034	Glass Bottle & Twisted Metal Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF035	x3 US 60mm M83A1 Illuminating Mortar Bomb Casings & Glass Bottle	HORSESHOE/MORTIMER VALLEY
AB14-SF036	x3 Glass Bottles	HORSESHOE/MORTIMER VALLEY
AB14-SF037	Flat Metal Band	HORSESHOE/MORTIMER VALLEY
AB14-SF038	IJ Wheel hub & Axle Assembly	HORSESHOE/MORTIMER VALLEY
AB14-SF039	Metal Lamp & US Illuminating Mortar Bomb Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF040	Wheel Hub, Tie Rod & Cooling Core	HORSESHOE/MORTIMER VALLEY
AB14-SF041	US 60mm Mortar Bomb Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF042	Metal Storage Drum & Large Shrapnel Fragments	HORSESHOE/MORTIMER VALLEY
AB14-SF043	Japanese Glass Bottle	HORSESHOE/MORTIMER VALLEY
AB14-SF044	IJ Survey Marker	HORSESHOE/MORTIMER VALLEY
AB14-SF045	US Naval Ordnance - 5inch Mk35 Projectile & 60mm M83A1 Illuminating Mortar Bomb Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF046	US Ordnance - 60mm Mortar Bomb	HORSESHOE/MORTIMER VALLEY
AB14-SF047	US Naval Ordnance - 5inch Mk35 Projectile & IJ Metal Cart	HORSESHOE/MORTIMER VALLEY

AB14-SF048	Metal Tent Stake	HORSESHOE/MORTIMER VALLEY
AB14-SF049	US Ordnance - 30lb HE Demolition Charge	HORSESHOE/MORTIMER VALLEY
AB14-SF050	Pick Axe Head & US 81mm M56, M57 or M301 Mortar Bomb Fragment	HORSESHOE/MORTIMER VALLEY
AB14-SF051	IJ Kendo Masks, Tent Stake & 81mm Mortar Bomb Cloverleaf Bundle Midcap	HORSESHOE/MORTIMER VALLEY
AB14-SF052	IJ Bicycle Frame	HORSESHOE/MORTIMER VALLEY
AB14-SF053	US 81mm M56, M57 or M301 Mortar Bomb Base & Fin Assembly	HORSESHOE/MORTIMER VALLEY
AB14-SF054	Wheel Axles	HORSESHOE/MORTIMER VALLEY
AB14-SF055	IJ Survey Marker	HORSESHOE/MORTIMER VALLEY
AB14-SF056	IJ 50mm Type 10 Grenade Discharger - complete	HORSESHOE/MORTIMER VALLEY
AB14-SF057	IJ 6.5mm Type 38 'Arisaka' Rifle Barrel	HORSESHOE/MORTIMER VALLEY
AB14-SF058	US M140A1 81mm Mortar Ammunition Container, Shovel & IJ Mess Tin	HORSESHOE/MORTIMER VALLEY
AB14-SF059	IJ 6.5mm Type 38 'Arisaka' Rifle Trigger Guard	HORSESHOE/MORTIMER VALLEY
AB14-SF060	IJ Broken Metal Rimmed Spectacles, Buckle, Button & IJA Respirator Eye Lens	HORSESHOE/MORTIMER VALLEY
AB14-SF061	IJ Railway Track Anchor Iron	HORSESHOE/MORTIMER VALLEY
AB14-SF062	IJ Battery Powered Torch (flashlight)	HORSESHOE/MORTIMER VALLEY
AB14-SF063	IJ 37mm Cartridge & Large Metal Cooking Bowl	HORSESHOE/MORTIMER VALLEY
AB14-SF064	IJ Collapsible Hand Cart & Wheel	HORSESHOE/MORTIMER VALLEY
AB14-SF065	US Water Canteen Inscribed 'CORBI'	HILL ROW #2-3
AB14-SF066	US 60mm ’18 to Bundle’ Cloverleaf Ammunition Container Lids	HILL ROW #2-3
AB14-SF067	US M1A1 ‘Thompson’ Sub-machine Gun Magazine - fully loaded	SOUTH 100 ESCARPMENT
AB14-SF068	US Ordnance - x2 Mk2 Hand Grenades	SOUTH 100 ESCARPMENT
AB14-SF069	US Ordnance - US M15 WP smoke grenade	SOUTH 100 ESCARPMENT
AB14-SF070	Ordnance - IJ Type 99 Hand Grenade & US M1 Carbine magazine	SOUTH 100 ESCARPMENT
AB14-SF071	US Ordnance - x3 Mk2 Hand Grenades & US Bayonet	SOUTH 100 ESCARPMENT
AB14-SF072	US Ordnance - 2.36inch M6A5 HE AT Rocket Projectile	SOUTH 100 ESCARPMENT
AB14-SF073	Material Assemblage - US Small Arms Ammunition & Canteen	SOUTH 100 ESCARPMENT
AB14-SF074	US Food Ration Can - unopened	SOUTH 100 ESCARPMENT
AB14-SF075	US Ordnance - x2 Mk2 Hand Grenades	SOUTH 100 ESCARPMENT
AB14-SF076	US Ordnance - US M15 WP smoke grenade	SOUTH 100 ESCARPMENT
AB14-SF077	US Naval Ordnance - 5inch Mk35 Projectile & US Canteen Cup	HILL B
AB14-SF078	US Naval Ordnance - 5inch Mk35 Projectile	HILL B
AB14-SF079	US Jerry Can	HILL B
AB14-SF080	US .30 cal Ammunition Box Lid	HILL B
AB14-SF081	US Jerry Can	HILL B
AB14-SF082	US Jerry Can	HILL B
AB14-SF083	US Jerry Can	HILL B
AB14-SF084	US Jerry Can	HILL B
AB14-SF085	US M1918A1/2 BAR Magazine & US Army M3 Respirator Face Mask	HILL B

Appendix 8. Detailed Contour Map of Peleliu