

FORT SCRATCHLEY – NEWCASTLE.

Nomination for Engineering Heritage Recognition



Figure 1 Fort Scratchley today- Photo courtesy of Fort Scratchley museum

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1. Introduction

This proposal has been prepared by Judy Lindsay, on behalf of Engineering Heritage Newcastle, with support from Rod Caldwell, former curator of Fort Scratchley Historical Society.

In attempting to tease out engineering significance, the vast military component is interwoven with engineering achievement. Past naming of engineering disciplines has evolved from a differentiation between military engineering and civil engineering. At this fort the two are intertwined and it is difficult to recognise one without its interdependence on the other.

Fort Scratchley has been identified as having outstanding heritage significance according to the National Heritage List criteria including historic, rarity, scientific, representative, aesthetic, creative/ technical, social and associative. Fort Scratchley is the largest and most diversified and intact coastal fortress barracks complex in Australia. Its setting which encompasses views to and from the site and a dramatic interface with the city of Newcastle. Fort Scratchley is listed as part of the Coal River precinct on the State Heritage Register.

The site on which Fort Scratchley stands has held meaning for peoples before and after European arrival. Prior to the building of Fort Scratchley, its prominent location encompassing topography of a hill overlooking the entrance to the Hunter River and eastwards to the ocean, favours its function as a lookout and signal station. The fort forms part of the Shepherd's Hill Defence Group, which includes Shepherd's Hill, Fort Wallis and Fort Scratchley. Whilst Shepherd's Hill and Fort Wallis sites are well known, they are no longer

intact and though they have military significance, they do not have comparable engineering significance that Fort Scratchley has. This proposal is only for Fort Scratchley. The fort was closed for restoration by the Commonwealth in 2004. And with the ownership of the fort transferred from the Commonwealth to Newcastle City Council in 2008, has seen the development and implementation of a management plan in 2013 by the council. The day to day operations of the fort are run by volunteers from the Fort Scratchley Historical Society, offering guided tours of the tunnels, and access to the museum and military buildings throughout the site. There are some 60,000 to 80,000 visitors to the fort annually.¹ Activities and events held to commemorate Anzac Day, Remembrance Day and the date that Newcastle was attacked by the Japanese in WW2 are very popular and the firing of the guns at those events is held with great affection and regard by the community for the fort – its imposing presence and the history it represents to the people of Newcastle. The fort also fires a gun to welcome cruise ships arriving to the harbour and it is believed that this is the only place in the world that does so. There is also a daily firing of the gun at 1pm and this is linked to the time ball on the nearby former Customs House. Shortly before 1pm, the ball rises up a pole and at 1pm as the fort gun is fired, the ball drops.

Today, a site overview reveals an inner fort encompassing gun emplacements, Battery Observation Post and associated fortress structures and underground tunnels, the Commandants Cottage, the Barracks and associated buildings on the lower section. The inner fort precinct is most important in terms of significance and original structures.

The outer fort encompasses a number of buildings, open space, car parking and the main entrance and driveway to Nobbys Drive. The buildings include the Master Gunner's Cottage and the workshop and a Multipurpose Centre.

¹ Data provided by Fort Scratchley Historical Society – 2019.



Figure 2 Dawn service Anzac Day 2010. Photo- courtesy of FS Historical Society



Figure 3 Dawn firing of gun at Anzac Day service 2010. Courtesy of FS Historical society

2. Heritage Award Nomination Letter

Learned Society Advisor

Engineering Heritage Australia

Engineers Australia

Engineering House

11 National Circuit

BARTON ACT 2600

Name of Work: Fort Scratchley at Newcastle

The above mentioned work is nominated to be awarded an Engineering Heritage Marker.

The fort is located at Nobbys Road, Newcastle.

The grid reference is -32.925927, +151.791887

The owner is Newcastle City Council

Address

The owner has been advised of this nomination and a letter of agreement is attached.

Access to the site is free public access apart from closure one day / week within the fort walls.

Nominating Body is Engineering Heritage, Newcastle Division

Merv Lindsay

Chair Engineering Heritage Newcastle, Chair National Engineering Heritage

3.1 Basic Data

Item Name: Fort Scratchley

Location (grid reference): -32.925927, +151.791887

Suburb/ Nearest town: Newcastle **State:** NSW

Local government Area: Newcastle

Owner: Newcastle City Council

Current Use: Public recreational facility including a Military museum, guided Tunnel tours and general access to all military buildings both inside and outside the fort walls.

Former use: Military Fort

Designer: Fortifications design by Sir William Jervois and Lt Col. Sir Peter Scratchley

Builder: State and Commonwealth Governments. James Russell (builder) - engineer who won the contract in December 1880 and for remodelling of gun emplacements in 1889 in preparation for installation of the disappearing guns. Samuel Campbell – architect and Civil Engineer worked in Colonial Architect's department to superintend the construction on behalf of the Government.

Year started: 1882. **Year Completed:** Ongoing works aligned with technological military developments until 1945.

Years of Operation: 1880 To 1972

Physical Description: Gun emplacements, Observation post, Barracks, Commandant's Cottage, Tunnels & other associated buildings.

Physical Condition: Very Good

Modifications: refer to section on Defence system

Historical Notes: see History section following.

Heritage Listing: State listing for Coal River precinct with Fort Scratchley being a component

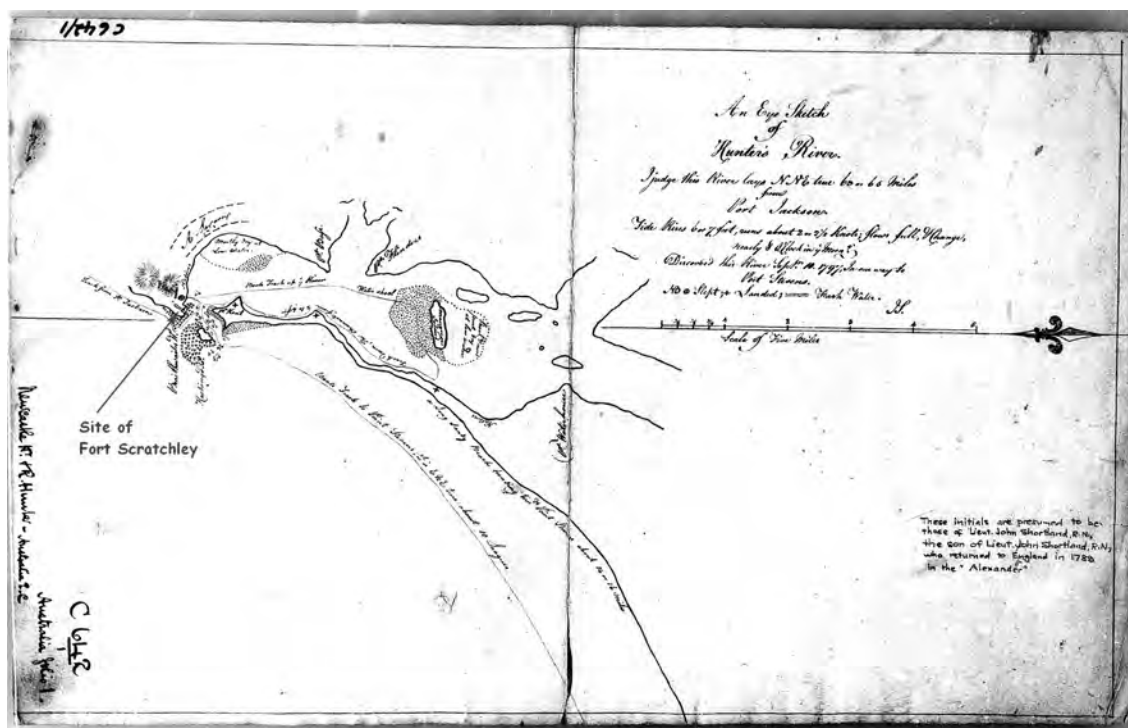
3.2 HISTORY

The headland known as Fort Scratchley (formerly Flagstaff Hill) has long been associated with the history of Newcastle. Two natural features dominated early history: its height offered a prominent lookout; and seams of coal were readily accessible around the base. Both are understood to have been used by the Awabakal Aboriginal people who are the traditional custodians of the lands and waters of Newcastle. The discovery of the coal seams by Lieutenant John Shortland during his search for escaped convicts, led to the first European coal mine in Australia and probably the first coal mine of any kind in Australia. Mining was undertaken using convict labour during the first European settlements of 1801 and 1804. In time, coal became an economic mainstay of Newcastle and the Hunter Valley. In 1813, a coal fired navigation beacon was set up on Beacon Hill and continued until 1857. A flagstaff and signal station were also erected in 1822, replacing an old coal beacon which had guided shipping. These structures later became the Harbour Master's residence and were demolished later to make way for the construction of the Fort.²

The word 'Fort' implies guns and there is evidence that there have been guns at the Fort Scratchley site as early as 1822. These were probably small smooth bore muzzle loaders and required for control of the convicts. The colonial surveyor, Dangar refers to the site as Fort Thompson and it is thought that the name was derived from the garrison commander at that time.³ By 1855 with the formation of the Newcastle Volunteer Artillery Corps, guns used were 6-pdr muzzle loaders and in 1866 the armaments in use were 32-pdr smooth bore muzzle loaders and these remained at the fort until 1901. Then in 1874, the Volunteer Artillery Battery took possession of two 68-pdr SBML guns, that also remained at the fort until 1901 but are now situated at Silo Hill overlooking Stroud, about 70 Kms north of Newcastle.

² Wyness Thesis, University of NSW. "Coastal Defences 1788 to 1900". 1965

³ R. Barber- Curator FS Historical Society.



-Figure 1. Sketch of Hunter's river by Lt. J Shortland 1797 (the headland on which fort Scratchley was established is identified. Courtesy of Coal River 2008.



Figure 4. FS Fort- Early 1880s. Photo courtesy of FS Historical Society



Figure 5 Photo- Courtesy of FS Historical Society

The strategic importance of a hilltop overlooking the harbour was recognised as early as 1804 and by 1828 an earthen battery was constructed and equipped with 7 guns. In 1876, with fears of Russian attack, the British Government at the request of the NSW government sent Major General Sir William Jervois and Lieutenant Colonel Peter Scratchley to advise on naval defences. Under the direction of Jervois and Scratchley, Colonial Architect James Barnett oversaw construction of the Fort. Initially, construction works began in 1881, but trouble with old mine workings necessitated a visit by Scratchley. As a result of this visit, Mr Thomas Croudace, JP, Manager of Lambton Colliery, was appointed to superintend necessary mining engineering work at the site. Once the problem of undermining was overcome,

construction continued.⁴ The fort was designed around a battery of 3 guns facing eastward in an arc to the ocean, with other guns covering the harbour to north and west. The gun emplacements were cut into the top of the hill to present a low profile to attack.

The new guns were in position by 1882 and construction of accommodation for the troops followed with the Commandant's cottage and barracks building completed in 1886. Other small detached buildings were also built at this time and in 1892 the dry moat and perimeter wall were completed. Mines laid in the harbour channel could be exploded from a control pit at Fort Scratchley.

The guns and their enclosures were changed several times during the C20th as military technology developed. They were used on several occasions during each of the world wars to halt unauthorised shipping movements through the harbour mouth. On the night of 7-8 June 1942 the Battery's 6 inch guns fired 2 salvoes at a Japanese submarine that bombarded Newcastle with about 2 dozen shells, becoming the only coastal fortification to fire on an enemy Naval vessel.

The area outside the Fort walls has also been continuously occupied, including many buildings related to navigation or the military. Some of these remained even after the Fort was constructed, such as an assistant Harbour Master Cottage directly outside the main Fort gates and 9 pilots' cottages along Nobbys road. Various military buildings stood outside the Fort's walls along both sides of the entry road. Only the Master Gunner's Cottage and transport garage remain in this area.

The guns at the Fort were decommissioned in 1962 and the Fort closed in 1972. It was vacant until 1977 when Newcastle City Council entered into a lease with the Commonwealth over the site.

Under Council's control the site became home to the Newcastle Regional Maritime Museum in 1977 and the Military Museum/ Fort Scratchley Historical Society in 1982. Both of these groups took an active role in conserving the site and interpreting its history to visitors.

⁴ L. Carey & others. "Fort Scratchley, Newcastle. NSW". The Council of the City of Newcastle. 1986. P11.

The outer site continued to be used as recreation space by local residents with picnic tables and children's playground also being used as recreation space by visitors. The inner Fort was opened to the public with the Maritime Museum and guided tours of the tunnels operated by the Historical Society adding to the visitor experience.

In January 2004, Council and the Australian Government executed an agreement whereby the Government would restore Fort Scratchley Historic Site, then transfer ownership to the Council. The Fort was closed to the public in April 2004. Restoration works were completed in 2008 enabling the transfer of the site to Council in June 2008".⁵

Time line

1797

- The Aboriginal presence in and around Signal Hill predates European contact.
- Lieutenant Shortland camped at the base of Signal Hill when he entered and surveyed the river and noted the coal seams in the cliff face.
- Colliers Point (then Nobbys Island) was the site of the first coalmining in Australia which continued to 1814.

1813

- A coal fired beacon and flagstaff was erected on Signal Hill to guide and warn mariners.

1822

- A signalling station was erected and the place became known as Signal Hill

1857

- Henry Dangar recorded the name Tahibihn Point at the site of Signal Hill on his map surveying the Hunter Region.

1880

- During ongoing hostilities between Russia and England, the NSW Government seeks advice from Sir William Jervois and Lieutenant Peter Scratchley to advise on colonial defences.

1882

⁵ www.newcastle.nsw.gov.au/Fort-Scratchley/History-Education/fort-History

- Construction began on permanent fortifications at Fort Scratchley. The guns were in position by 1882 and construction of accommodation for the troops followed.
- The old convict coal workings beneath the hill were sealed with a thick wall of concrete.

1942

- Return of enemy fire from a Japanese submarine.

1945

- Italian POWs were housed at Fort Scratchley for up to 2 years.

1954

- Fort Scratchley is used for National Service Scheme for militia training.

1972

- The Australian Army vacates the site.

1977

- The City of Newcastle given control of the Fort Scratchley site.

1982

- Official opening of the military museum.

1998

- Formation of the Fort Scratchley Historical Society Inc.

2005

- Convict coal mines below Fort Scratchley were discovered by the University's Coal River Working Party.

2008

- Ownership of the fort transferred from the Commonwealth Government to the City of Newcastle

COAL RIVER PRECINCT

The precinct is listed on the NSW State heritage register- Listing No. 1674

Fort Scratchley is one of the historic sites within the precinct. With its strong association to mining, maritime and military themes of the precinct, the re-discovery and investigation of the 1801 convict built coal mines under the Fort Scratchley site, adds another engineering dimension. The construction of the coal mines, the first in the Southern Hemisphere, resulted from a transfer of knowledge utilising 'bord and pillar' techniques. A geotechnical report of the exploration can be found in Appendix C.

WORLD WAR 2 ENGAGEMENT WITH THE JAPANESE NAVY

The return of fire from the Japanese submarine in 1942 is a well remembered event for many people of that era, living in Newcastle and is part of the folklore surrounding Fort Scratchley. This writer remembers her aunt talking about that night of the Japanese attack. Her aunt recollected that her husband had received a phone call from his workplace (BHP) and had left for work immediately. Then she heard guns firing from Fort Scratchley (approximately 4 Km away) and lamented how annoyed she was and that she wished the gunners would not have firing practice at night, just when she was trying to settle her children to sleep! Obviously the knowledge that this was a real attack hadn't occurred to her.

A documentary "War on the Doorstep" about the Japanese attack has recorded the oral testimonies of various military personnel and residents living nearby who were present during that attack. Despite the fact that the testimonies were recorded in 1979, it is evident that these people recollected in acute detail the event and spoke specifically about the military response, armaments and the rationale for why the response was carried out the way it was.⁶

Many years later, contact was made with the Japanese naval officer (Susumui Ito- Figure 4)) who was the pilot of an aircraft attached to the submarine. The aircraft was not used the night of the Newcastle attack but Ito was aboard that night. He has visited Newcastle in the post war period and died only a few years ago. (Figure 5 shows where the aircraft is stored on the submarine). The

⁶ "War on the Doorstep" The Japanese attack on Newcastle 8 June 1941. A documentary by Martin Hadlow 2NUR-FM 1979. CD- courtesy of Fort Scratchley Historical Society.

journal of the submarine commander states that the firing of the guns from the fort were very accurate in locating his submarine and this ultimately led to the submarine withdrawal. It is understood that the submarine had surfaced north of Nobbys headland which would have hidden it from view of the Fort Scratchley lookout and enabled him to fire west to the BHP and industrial area of Newcastle.⁷ It is understood that the targets were the Iron and Steel Works (BHP), the dockyard and an airport on Walsh Island which was no longer in use during the war, but not known to the Japanese intelligence. An interview with Major Wally Wallace, the officer who gave the orders to the 2 gun crews to fire the guns is available for viewing at the Fort Scratchley museum. Discussion with Ron Barber, curator at the museum, stated that there was only a small military force operating the fort during the war and that the daily operations were primarily carried out by women. The fort's website refers to the role of women at that time and several memories of some women are recorded. One of them- Grace Jones who worked in Signals is a most amusing account but clearly outlines the important work women performed during the war years.⁸

Figure 6 Susumi Ito. Photo courtesy Fort Scratchley Historical Society



⁷ Anecdotal evidence Frank Carter- President FS Historical Society. The captain's journal is unavailable at the fort museum.

⁸ R. Barber- curator FS Historical Society



Figure 7 Model of Japanese submarine- photo courtesy of FS Historical Society



Nº. 1, 6 inch Mark VII Gun at Fort Scratchley in 1946, showing the additional shields and overhead canopy added to the guns after the Japanese attack in 1942.

Figure 8 Photo courtesy of FS Historical Society



Figure 9Photo - courtesy of FS Historical Society

3.3a The Defence Scheme

Initially the headland, on which Fort Scratchley stands, was the first location for a beacon and signal station for shipping outside Sydney. A prominent signal/ flag pole had remained ever since. Guns to protect the port of Newcastle were established from about 1830. With the review of the coastal defences by Jervois and Scratchley saw the construction of the fort, designed to protect Newcastle as a strategic coaling port from naval attack in 1882. Initial armaments were 3 x 9 inch ML guns in open 'barbettes' facing the sea. 3 x 80 Pdr ML guns in underground casemates facing the harbour entrance and 1 x 80 Pdr ML gun in open 'barbette' facing the harbour. Jervois and Scratchley's design incorporated a system of interconnected tunnels and magazines dug behind to service the guns. From the 2 main magazines for cartridges built into the middle of the hill, these tunnels provided safe access to the casemates and to 2 shell lifts which safely accessed the rear sides of major seaward ordnance. The Fort Scratchley gun battery was the dominant coastal defence installation for Newcastle until 1889.

By 1889, the 3 x 9 inch ML guns became obsolete and were replaced by 2 x 6 inch and 1 x 8 inch BL Hydro-Pneumatic 'disappearing guns. These guns,

protected when retracted by a close fitting iron cover, were installed into the modified 'barbettes. This system enabled a gun to be loaded and aimed below parapet level. Then by release of a valve, the gun carriage would rise above the parapet, the gun would fire, and then be forced down by the recoil to be reloaded.⁹ There followed development of an integrated defence system. In 1889, an 8 inch disappearing gun was installed at Shepherd's Hill, about 1 km further south along the coast, with both batteries controlled from a Fortress Observation Post (FOP) also on Shepherd's Hill. With the approach of WWI, the Newcastle Port defences were enlarged by 2 additional guns near Shepherd's Hill and a major new defence complex installed on the north side of the harbour at Stockton, called Fort Wallace. Fort Scratchley armaments were changed in 1910, due to technology advances and the disappearing guns had become obsolete. As the speed of ships had increased to a level where the slow fire rate of the disappearing guns (one round/ minute), no longer provided effective protection. So the replacement of the 8 inch BL HP gun and the most northerly 6 inch BL HP gun with 2 more reliable 6 inch MK& BL naval guns facing the harbour entrance was made. Prior to WW1 further strengthening to the ramparts was made on the seaward walls of reinforced mass concrete. Throughout the life of all the guns at Fort Scratchley, the guns were aimed by manual sighting methods.

⁹ L.Carey. 'Fort Scratchley, Newcastle, NSW', The Council of the City of Newcastle 1986, p13.



Figure 10 Before the barracks were built c 1880 - Photo courtesy FS Historical society

Built facilities constructed after the completion of the gun batteries and tunnels, were the barracks and Mess complex with courtyard, the Commandant's Cottage, and a complex of auxiliary buildings in the Fort's walls housing Military Police with a small gaol, a laboratory for assembling gun cartridges and ablution blocks. These improvements still exist. Outside the fort walls, other auxiliary buildings of timber construction were built for the various army units that were present at the fort throughout its life. Only the "Master Gunners Cottage" still exists.¹⁰

The late 1880s saw completion of the perimeter fortifications, with the construction of the 170 feet long loopholed brick and concrete wall, and gates beyond the trench. Materials used for construction of the modifications were hauled from old Gaol Hill (Parnell Place) by means of a tramway, including 14,000 tons of Melbourne blue metal used in the concrete works.¹¹

¹⁰ Scratchley: Report on Coastal Defences of NSW and Other Colonies (Jervois and Scratchley) 1877

¹¹ L. Carey. 'Fort Scratchley, Newcastle. NSW' p13

Prior to WW1, a new access to the existing tunnel complex was provided by stairs between the guns. In 1911 the observation post and signal tower was built. The MkV guns mounted at Fort Scratchley were last fired in night target practice in March 1962.

Then with the approach of WW2, very little change was made to Fort Scratchley. The observation post was improved in 1939. However the forward line of coastal defence was held by 9.2 inch guns which were installed in many places around the coast. These guns were for use in a counter bombardment role against capital ships, whilst those at Fort Scratchley were for close defence. During WW2, other defence facilities around Newcastle were upgraded, so that Fort Scratchley became incorporated in the defence system, instead of being independently operated. Shepherd's Hill became the command centre for the area and this station was linked by telegraph and phone to all defence installations in Newcastle and also to Sydney defence network.

Throughout the whole period of Fort Scratchley's operation and other coastal defence forts, understanding military rationale of what constitutes optimal tactical advantage in the event of enemy attack is useful. "As the power of weaponry increased, fixed defences altered in both siting and construction. New materials were developed and because of clearly designed design criteria, bold, purely functional structures evolved."¹² "All forts were designed to provide maximum operational efficiency, their change in nature being a reflection of technological advance. It has been suggested that two of the most fateful interventions in the development of warfare were that of wireless telegraphy and the internal combustion engine. From observations of the defences of NSW, the invention of reinforced concrete for defence works could be added to this list. Telephony enabled the whole coastline to operate as one fort while reinforced concrete revolutionised the structural concept of fixed defences. Each component part of the fortress could now be sited in its optimum location which greatly increased the efficiency of the observation

¹² J. Graham. Undergraduate thesis. University of NSW, Faculty of Architecture. "The Coastal Defences of NSW 1900-1969". 1969

system and meant that the siting of batteries was no longer a result of compromise".¹³

On the cessation of hostilities in 1945, the guns were maintained in working order by permanent troops. In May 1952, National Servicemen commenced training as 13th Medium Coasts Battery, RAA, continuing on until 1962 to become a Light Anti Aircraft battery. By 1972, most of the guns and equipment in the Newcastle area were either scrapped or returned to army stores. For the next 5 years Fort Scratchley was at the mercy of vandals and the elements until 1977 when restoration commenced.¹⁴ Restoration of the fort was carried out until 1984.

¹³ Ibid.

¹⁴ L.Carey, 'Fort Scratchley, Newcastle.. NSW'p15

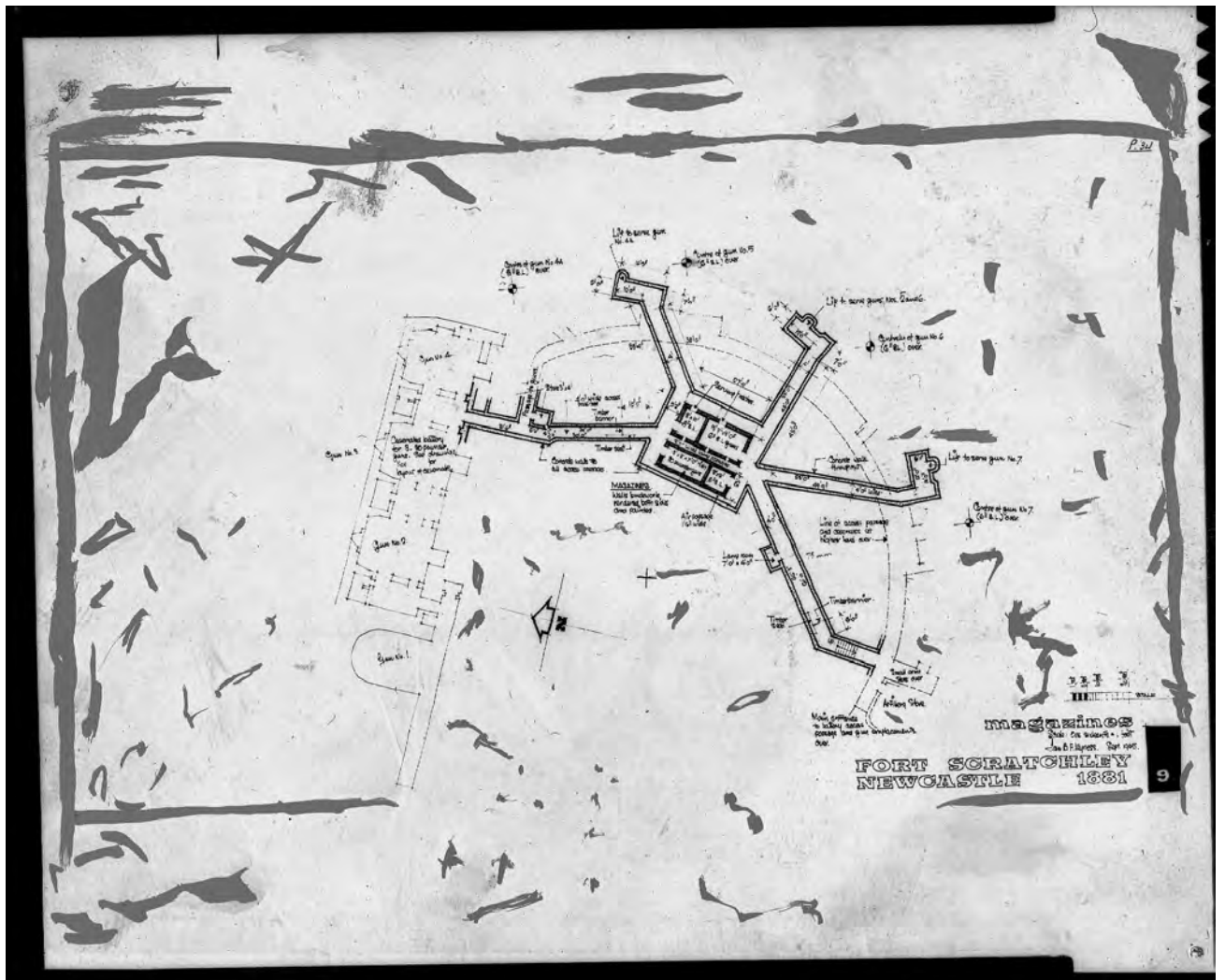


Figure 11- Fort Scratchley Plan 1881

3.3b Engineering Evolution.

The main elements of the fort were constructed in the last years of the C19th and so represent the civil construction methods of that era which is predominantly the last era of small scale unreinforced concrete construction and the tunnels are particularly good intact examples of this construction. The evolution of the fort over the following 50 years results in various examples throughout the facility of the changing engineering construction methods that evolved particularly with the introduction of reinforced concrete. The exceptional durability of the unreinforced elements compared to some of the

early examples of reinforced concrete enable us to understand the evolving knowledge over that period and beyond. During the restoration work undertaken for the transition of ownership to Newcastle City Council, circa 2010, there were minimal restoration works required to the original mass concrete elements whereas reinforced concrete elements required extensive works to restore and enhance durability.¹⁵

The fort is constructed jointly of concrete and brickwork and the plan shape is approximately a half-circle with 3 barbette gun pits (originally) on the western arc, joined on the north by an underground casemated battery for 3 guns. The pits are constructed of concrete with parallel side walls with a semi-circular front wall of 14 feet radius, in which are placed recesses and ring bolts. The wall forming the outer face of the pit was of mass concrete to a thickness of approximately 7 feet. The guns were mounted on steel pivots placed on a sandstone platform.¹⁶

The gun pits were linked by a bomb proof access passage varying from 5 feet to 6 feet wide, the entrance to which was placed on the south end of the arc, away from the sea. The walls and floor of the passage were concrete, the roof being an 18 inch thick arched concrete slab giving an average ceiling height of 8 feet at the centre.¹⁷

The fort also contains 8 underground tanks for independent water storage. They are situated between the barracks and the guardhouse, with the largest tank capable of holding 42,000 gallons.¹⁸ These tanks are still in place and intact. They are cut into rock, and masonry construction including clay brick masonry domed roofs. During the restoration work in 2008 the domed roofs were analysed and found to be surprisingly strong. The tanks have been filled with sand as a safety precaution against catastrophic failure under abnormal loading.¹⁹

“The structural modifications are also evident in the tunnels and magazines, made to accommodate new ammunition, or to service the new guns when

¹⁵ M. Lindsay- Lindsay Dynan Consulting Engineers- supervisors of restoration works 2010

¹⁶ Wyness Thesis.

¹⁷ Wyness Thesis- pages 34-36. This thesis provides comprehensive details of measurements for all the tunnels and pits

¹⁸ L. Carey. Fort Scratchley, Newcastle, NSW. P13.

¹⁹ M. Lindsay

they were changed. Changes in the lighting systems of the tunnels, from candle lamps of the C19th to electric systems of WW2 demonstrate technical developments over half a century of use. The most significant example of structural modification is in the roofing of the open tunnels serving the 3 guns “en barbette” when, in 1889; those 3 positions were updated for disappearing guns. This modification uniquely provided the fort with fully enclosed fighting areas. There is little evidence in other Australian forts of such major structural rearrangements over a long period.

The major flanking batteries at Fort Scratchley combine both ‘en barbette’ (open) gun pits to seaward and the outstanding ‘casemates’ (enclosed gun positions) protecting the river entrance. The gallery of 3 casemates at Fort Scratchley is representative of the prevailing, late C19th style of battery construction in the larger British forts, such as Fort Nelson.

The 1880s designed tunnel system at Fort Scratchley is of rare quality and a part of the fort that is most highly valued by its local community. The system is extensive and, except for the 1889 roofing of the western passages is quite original. The layout is innovative as the tunnels always run downhill in the direction of loading ammunition, either into the central magazines, or out of them to the deep shell lifts.

Walls of the original fortifications built at Fort Scratchley in 1882 were constructed in mass concrete. Modifications were made in 1889 to accommodate the ‘disappearing guns’ and in this instance, concrete across the roof of the tunnels was reinforced with sections of iron railway line of ‘bull-head’ profile. Similar construction was used at Bare Island Fort, which was ‘mostly completed’ by 1886. Both forts were very early examples of the use of reinforced concrete in Australia.

The rampant walls of Fort Scratchley, which enhance its external appeal, are built of concrete. The lower walls around Fort Drive were constructed in 1885 using mass concrete. The upper, sloping ramparts were constructed of reinforced concrete in 1914 as battery protection. The upper walls and sloping top surface of the fort is representative of the British ‘design factor’ that a ‘glacis parapet’ was found to ‘...divert the incoming shells over the works themselves.

The above ground buildings are also representative of British planning principles, by their placement at the rear wall below expected enemy fire. This location also places garrisoned troops in a position to readily man defensive positions at the rear walls against attack from the landward side. The Fort buildings remain largely intact and the planning arrangement of the complex is generally unchanged since the 1880s”.²⁰

The Wyness thesis reiterates that the condition of the fort in 1965 (not long before the military vacated the site) was in excellent state of repair,” due undoubtedly to having been continually occupied, since its completion as a coastal battery, under the control of the Royal Australian Artillery unit, which mans the fort. Used today as a store, all works are in very good condition, and after uninterrupted rain, there is no trace of dampness even as far below ground as the magazines and passages.” Wyness believes that the fort is worthy of preservation.²¹ Photos from the thesis that illustrate the state of the structures compare favourably with the state of the structures today in 2019. The restoration of the fort undertaken in the early 2000s has been very successful.



Figure 12 Overview of the fort 11/11/18- Photo- courtesy of FS Historical Society

²⁰ R. Caldwell- 'Comparative Analysis' taken from Consultants Management Plan (2013)

²¹ Wyness thesis- p41

4. COMPARATIVE ANALYSIS- this section was prepared and written by Rod Caldwell and can be found in its entirety in 'Fort Scratchley Historic Site, Newcastle Heritage Management Plan 2008'

"This comparative analysis attempts to place the Fort Scratchley site in a state and national context, as well as identifying the continuing tradition of British military planning that has been used as a basis for the planning of military defences throughout the British colonies. It also looks at comparative examples of coastal fort complexes and similar defence installations in Australia, either contemporary with Fort Scratchley, or with similar functions or physical form.

Comparisons and Relationships with British Forts.

A comparative analysis of C19th fortifications in Australia involves reference to their British origins. This comparative analysis will only discuss coastal defence heritage sites in NSW and Victoria. It is recognised that the planning of Australian colonial fortifications borrowed from British and European military design principles, of which Fort Nelson (1860s) in Portsmouth UK is the most intact example. A dry ditch surrounds the fort, built not so much in a manner to prevent approach, but to expose a potential attacker in defensive fire from the loopholes in the wall. Fort Nelson also has an extensive network of tunnels similar to those at Fort Scratchley, which provided safety for the gunners as they reloaded and serviced the artillery.

The C19th saw many conflicts in which the designs and hardware of warfare were tested and either discarded, or copied, depending on their success. The Napoleonic wars started the century, leading to the greater use of gun casemates and caponiers (bomb proof enclosures). Similarly the association of submarine (or torpedo) mining with coastal forts was first proven against the French/British/ Ottoman forces by the Russians during the Crimean Wars (1853-56) at the Kronstadt forts.

On 18 December 1876, the Governor of NSW telegraphed a request to the Home Secretary of State, on behalf of several Australian Colonial Governments, for the loan of an imperial officer to report and advise upon

forts and defences, Victoria, Queensland, and South Australian later became involved and agreed to share costs.

William Jervois, who came to prominence as a military expert during the 1850s, was selected and arrived in Australia in early 1877 accompanied by Lieutenant Colonel Peter Scratchley R.E. Their report resulted in the establishment of permanent coastal defences in Newcastle, later to become known as Fort Scratchley. The rapid advances in military technology and ordnance in the second half of the Nineteenth century and into the Twentieth century determined the substantial alterations to Fort Scratchley in the 1890s and the 1930s.

Fort Scratchley is one of the few Australian sites that continued to be manned and to be militarily redeveloped. The site still provides evidence of this evolution.

METHOD FOR COMPARISON

For this comparative analysis similar coastal batteries will be described and examined with respect to the following attributes;

- History
- Ordnance and technology
- Structures
- Military features
- Associations with eminent persons
- Topography and public access.

These headings allow comparison of those common and distinctive attributes for coastal C19th forts and can relate closely to criteria later employed for assessing heritage significance.

Sydney Harbour Forts (C19th)

History

The major C19th defences planned for Newcastle had a similar origin to those planned for Sydney Harbour, as they either originated, or were largely modified, as a result of a review of coastal defences in NSW by William Jervois. As distinct from most other forts in this comparative analysis, the Sydney forts have been managed by the same government and military authorities until recent times (c1970s).

In the period 1800 -1830, three coastal batteries were developed immediately around Sydney Cove: Fort Phillip on the site of today's Sydney observatory, Fort Macquarie at the site of today's Opera House and Dawes Point, now under the southern approaches to the Harbour Bridge; and a lone distant battery was erected on Middle Head in 1801.

Wider defence sites around the harbour were established in the mid C19th; mainly in response to various perceived threats from Britain's enemies. Fortifications were added at an inner line of Harbour defence sites in the 1850s. Pinchgut (Fort Denison), Kirribilli Point and Bradleys Head.

In the early 1870s, a Defence Committee recommended the establishment of batteries on Middle Head, Georges Head and South Head again strengthening the outer line of Harbour defences. These defences were designed locally by the Colonial Architect James Barnet.

A final phase of C19th construction occurred following the recommendations of the visit to Australia by British military experts William Jervois and Peter Scratchley. In his 1877 report, Jervois recommended a total of 42 guns at 12 different batteries around Sydney harbour, compared with 7 guns at one battery for Newcastle. The scale of resources to be applied to these coastal defences is similarly contrasting: Capital costs of the works at Sydney Harbour were estimated at 95000 pounds with 25000 pounds for Newcastle; while a

total of 2,363 personnel would be required to be maintained at Sydney compared with only 80 regular artillerymen and Naval Militia at Newcastle. Newcastle was the only other port outside Sydney that Jervois and Scratchley recommended for extensive fortifications.

Ordnance & Technology

The early Sydney forts of the C19th were armed with muzzle loading guns (ML) similar to British naval guns. The rapid technological developments in ordnance in the C19th at Sydney Harbour coastal defence sites is demonstrated by the fortifications at Middle Head which show the many layers of defence at this site.

The greatest period of activity in revision of C19th defence came in response to the 1877 review by Jervois & Scratchley. According to historian, Browning, "Their recommendations were accepted and a number of forts were constructed as a result and modifications made to existing forts. In essence, they recommended the use of the biggest guns possible."

This practice of changing gun emplacements around the Harbour forts in the last decades of the C19th was considered necessary to improve coastal firepower to meet the technological advances and increasing scale of naval firepower. The Sydney Harbour forts on the outer line of defence continued to be updated until 1907 when some of the batteries were reconstructed for 6-inch Mark V11 BL guns, but "...by 1911 the armament of the Sydney coastal defences had been drastically reduced and consisted of only 20 guns mounted in 6 locations. The major project pre –WW2 was the fortification of North Head." The six-inch gun batteries remaining at Middle Head and Georges Heights were prepared for use in a close defence role during WW2.

Structures.

As will be noted from the descriptions of the Harbour forts above, most of the guns in the Sydney Harbour fortifications were emplaced in open pits, otherwise known as *en babette*. This was because of the favourable nature of the Harbour surrounds allowed the guns to be situated well above the firing level of any attacking naval gun.

The alternative to this open style of emplacement was the enclosed fortress, used where required gun positions were exposed to attacking naval gunfire. There are only 2 locations in Sydney Harbour defences where the guns were enclosed: Fort Denison and the 'Beehive' batteries on Georges Head. Fort Denison was designed in 1862 to include a 'Martello Tower' to protect the ordnance. This rounded sandstone structure has a protected flank for accommodation and amenities. In comparison/ contrast, the 1871 lower or 'beehive' casemates and the associated 1886 upper or armoured casemates of Georges Head quarried into the raw sandstone at the base of the harbour side cliff of the headland. The casemated batteries at Georges Head are unique in the Sydney area and feature a structure of excavated stone and a 'beehive' construction of brickwork enclosing the guns.

Military Features.

A significant adjunct to coastal defences in Sydney Harbour, which were strategically designed into the layout of the forts, were the submarine mines/ torpedo defence system, which was comprised of cable/mines laid across the entrance to the harbour in the vicinity of Sow and Pigs reef. The feature had its immediate counterpart in Newcastle in the submarine mines laid across the Port entrance under the Fort, as recommended in Jervois' 1877 report. Features of these installations in Sydney still exist at Green Point and Obelisk Point.

Associations with eminent persons.

In common with Fort Scratchley, the Sydney Harbour forts and Bare Island are associated with James Barnet, who as Colonial Architect in the period 1865 - 1891 was responsible for designs and works of all defence works in the colony of NSW.

Topography and Public Access

Middle Head and Georges Heights are sited in spectacular locations with panoramic views over the harbour. The link is more distant than at Fort Scratchley and in Sydney, the formerly barren landscape of the fort sites located in Sydney Harbour National Park is progressively dominated by the encroachment of the surrounding native bushland. As is the case in Newcastle

public access is readily available, however there is no public transport in the vicinity.

Port Phillip Bay Forts and Fort Queenscliff, Victoria.

In a similar manner to the comparison provided by the Sydney Harbour Forts, the defences of Port Phillip Bay make an interesting comparison with Fort Scratchley in respect of the scale and military engineering features. Of all the remaining Port Phillip Bay forts, Fort Queenscliff is the most important, being constructed as the main command and resource centre, the most historic and the best preserved. It functions today as the showplace of Victorian coastal fortifications with a museum open to the public. It makes an appropriate subject for comparison with Fort Scratchley.

History

In 1860 a battery was established at Shortland Bluff 57 Km from Melbourne, the site of Fort Queenscliff. Further recommendations proposed another four batteries at the entrance to the Port Phillip Bay. Hobson's Bay, the inner entrance to Melbourne, was also a point of discussion and 11 sites were recommended around this area.

The association of Peter Scratchley with southern Australian fortifications begins in 1860, when the Victorian Government applied to the British Government for the services of an officer of the Royal Engineers to superintend the erection of defences. Captain Peter Scratchley was appointed and advised the provision of batteries in Hobson's Bay and at the Heads (Scratchley 1860). Scratchley completed a 4 year term of duty in the Victorian Colony advising on defences, and most importantly was instrumental in establishing the Victorian Volunteer brigades (O'Brien, 2005).

In response to the Russian threat developing in the 1870s, Victoria was one of the first colonies to agree with the proposal put forward by the NSW parliament to engage expert advice for the defence of their colonies (LC of NSW 1876, 948). As a result, in 1877 Jervois and Scratchley were commissioned and they prepared reports and designed a defensive scheme. Coastal fortifications at Port Phillip Heads were established between 1879 and

1886. Major forts were located at Queenscliff, Point Nepean, Swan Island and in the South Channel.

Fort Queenscliff was the most important of these defences and it was the command centre of the system given its location and accessibility to Melbourne. By 1886, the defence system was complete. As at Fort Scratchley, new and improved guns were introduced over time. These guns came with increased firing ranges which resulted in the closure of some other forts. By 1909 only Fort Queenscliff and Fort Nepean were manned. During this time Port Phillip had achieved status as the most heavily guarded port in the British Empire.

The fort ceased to be a coastal defence installation by 1946, when it became the home of the Army's Staff College and was adapted for military service in other roles. Today, Fort Queenscliff remains a popular tourist attraction, accommodating the Fort Queenscliff Museum, with the future made even more secure due to the announcement in 2000 of a continuing defence related role as a Soldier Career Agency on site. A museum was established at Fort Queenscliff in 1982 to show the significance of the Fort in the local, state and national context. Considerable restoration has been accomplished in recent years, including the recovery and refurbishment of a range of representative guns and the restoration of historic building. An 8 inch HP BL disappearing gun is mounted for display. An archival centre provides a facility for historical research, while guided tours provide a means for interpretation of the place and accessibility by the public.

Ordnance and technology

The 1860 vintage fort defences were recommended for upgrading in 1877 by Jervois and Scratchley. The guns at Fort Queenscliff and its integrated coastal forts were updated during the 1880s in accordance with the new technologies and in military engineering that had rapidly become available. As for Fort Scratchley, Fort Queenscliff, as well as the other Bay forts, was updated with the latest ordnance technology. "The Fort contained 8 different types of gun over the 1863-1942 period." (Museum 1994, 13). The pattern of modifications was also similar to Fort Scratchley, including the installation of 6 inch HP BL

(disappearing guns in late 1880s, 9.2 inch BL guns in the early 1890s and from the turn of the century, 6 inch Mk V and later Mk V11 coastal guns.

Structure

Most of the fortifications guarding the entrance to Port Phillip Bay are relatively low level, compared to Fort Scratchley, or the Sydney Harbour forts, so they do not have the advantage of height over an approaching enemy. As a result, they are built to maintain a low profile with minimum obvious fortress elements that can identify gun positions. In comparing Fort Queenscliff to Fort Scratchley, it is important to note the location of Fort Queenscliff. Fort Queenscliff is located on the outskirts of the village of Queenscliff. Its history, operation and possibly even its unique design features are related to this close association with the Queenscliff community. Fort Scratchley is also located close to the city centre of Newcastle and has always had close association with the local community.

Fort Queenscliff has both landward and seaward defence structures. The most obvious and iconic feature of these is the Keep, built in 1882-4 with the traditional fortress embellishments of crenulated tower, gorge (dry moat), complete with loop- holed wall and uniquely, caponiers (projections which allow enfilade fire along the outside of the front wall). It is these obvious, visible classical design elements which, like those at Fort Scratchley, readily identify and attract the public interest in the place as a “fort”.

Military Features

Like Fort Scratchley, fort Queenscliff has a range of magazines for protection of ammunition and tunnels allowing the guns to be serviced under fire. Two former gun positions have been roofed over to form magazines. There are tunnel and gun positions to defend the gorge (a “sally port”) while other positions allow auxiliary guns to fire at low angles of depressions, not covered by the main guns. Adjacent to each main gun position is an underground magazine to store ammunition. Brass voice tubes still exist. Those were used for communicating reloading instructions to the magazines below. The shells and cartridges were raised to the gun positions through multiple vertical shafts, using a block and tackle system.

The magazines are of classical C19th style, and share many features with Fort Scratchley, including the divided design separated by lamp passage features that the British adopted to minimize risk of explosion. Seated recesses for the oil lamps are built into the magazine walls, and the passages have floor coverings, wood & bitumen to reduce sparks.

Association with Eminent Persons

In the manner of other Australian coastal forts, the Port Phillip Bay forts owe much to their association and development with the eminent British military engineer Jervois, but in the case of Victoria, more so with Sir Peter Scratchley, due to this earlier 4 year posting in 1860 as defence advisor and engineer. Fort Queenscliff has had strong and enduring relationships with the Australian Armed forces. The fortifications were first manned by the Queenscliff Volunteer Infantry and Artillery Corps, formed in 1859. Since 1883 the Fort has been manned continuously by the regular army. This is a distinct advantage for this Fort, as few other coastal fortifications, including Fort Scratchley, have retained the presence of the Australian Defence Forces.

Topography and Public Access

Fort Queenscliff retains a “military aesthetic” with minimal intrusive, interfering or unsafe embellishments, well controlled vegetation, and open grassed areas. On a site of 6.7 hectares, located on Shortland Bluff, the Fort has views over “The Heads” and “The Rip” of the entrance to the Bay.

Bare Island Fort, Botany Bay, NSW

Many elements of defence technology and strategic planning developed in the massive British forts of the UK are reflected here. The story of Bare Island, Botany Bay is useful as a comparison with Fort Scratchley because of similar origins, relative scale and, of course, the proximity to the entrance to a major port.

History

Bare Island had very early beginnings, being identified in the journals of Captain Cook as ‘*a small bare island*’, and later visited by Sir Joseph Banks in 1770. No major use, even for defence application was made of the Island until

1877, when like Fort Scratchley, Bare Island was proposed as one of the locations nominated for coastal fortifications in the report on Coastal Defences by Jervois (Jervois 1877). Construction began in 1881 on the fortification of Bare Island. Together with Fort Scratchley, it was one of the first major structures to be built of mass concrete with only minimal iron reinforcing. In Australia, it was designed to be self-contained with barracks and material stores to withstand a siege. The construction of the fort was improperly supervised with the contractor failing to comply with requirements for materials and construction. The resulting scandal led to the first Royal Commission in Australia and disgrace for Colonial Architect James Barnet.

In 1903 Bare Island was transferred from state to Commonwealth ownership with only the 6 inch gun operational and by 1908 it had ceased to serve any defence purpose. During WW2 both the Henry Head and Cape Banks batteries at Bare Island were brought back into military service with additional buildings and gun emplacements being constructed. Bare Island was briefly re-used as a fort during 1948. Most of the structures at Cape Banks were removed by the military between 1953 and 1962, however a number of houses and an underground bunker remain.

Bare Island was decommissioned in 1911. In 1912 part of the fort was converted into a home for war veterans. The war veterans continued to occupy the fort until 1963, following which it became a local and natural history museum operated by the Randwick Historical Society until 1976 when the museum was closed and the artefacts removed. On 1 October 1967 Bare Island became one of the first historic sites in NSW under the management of the newly created National Parks and Wildlife Service and was incorporated into Botany Bay National Park in 1984.

Ordnance and Technology

The 5 major guns installed at Bare Island were

- An RML 10 inch Mk11 of 18 tons installed on an iron, sliding dwarf carriage in the central casemate (No 3 gun position). Remarkably, the casemate was of latest design; being based on 9 inch thick iron plate, riveted across a roofed vault and protecting the front around the embrasure.

- Two RML 9 inch MkV guns of 12 tons on iron sliding dwarf carriages with D pivot, mounted 'en barbette' immediately flanking the main gun on either side (gun positions 2 & 4).
- Two RML 80 Pounder MkI guns on iron 80/68 Pounder Parapet carriages, 'en barbette', at the rear of each flank (gun positions 1 & 5).

The military planning principle was for a major gun, or battery to be emplaced at the centre of a fortification using the most up-to-date technology. It needed to be well protected from fire from a number of warships, i.e. be emplaced inside a casemate, or be of the 'disappearing type'. Importantly, other guns would protect the central battery, usually flanking batteries with open embrasures to the sides. "The basis for the Bare Island design, was a symmetrical crescent, with the heaviest gun in the centre, which faced the likely line of attack".

Fort Scratchley also shows elements of this design, especially at the height of its C19th armament, with an 8 inch Disappearing Gun as the central gun, flanked by lesser guns. However, the symmetry is not as obvious as at Bare Island. One of the new generation 'disappearing guns', on HPBL, 6 inch MKV, ordered by Colonel Scratchley in 1886, was finally installed into gun position 2, flanking the casemated 10 inch gun on the southern side. This was the only major ordnance upgrade made to the Bare Island's armaments during its coastal defence role.

The design principle which characterised Bare Island and correspondingly became a feature of Fort Scratchley was the installation of a 4th and larger 8 inch disappearing gun, located in a central position. This main gun was flanked, and protected by batteries of shape, facing the expected line of attack. Magazine and other services are located behind and protected on the landward side by walls, wet or dry ditch and barracks building. This symmetrical crescent arrangement was exhibited to a lesser extent at Fort Lytton (Brisbane), which being next to the river, was protected by a moat.

Association with Eminent Persons

Bare Island association with eminent persons includes strategists Jervois and Scratchley, the Colonial Architect James Barnet and to a lesser extent Ferdinand von Solt. This association with the latter, best relates to the

Forts' constructions. Whilst the strategic vision for Bare Island Fort was the work of Jervois, it was Scratchley's role to detail the designs, specify and inspect the works. He was supported by a civil engineer, for the Colonial Architect's office, Gustavus Morell, who prepared the construction drawings from Scratchley's designs and work started in 1881.

The construction became a lengthy story of incompetent workmanship, and inadequate supervision, reflecting poorly on both the contractor and Colonial Architect's office. After years of delay, evidence of water ingress in the tunnels and other defects, a British coastal defence expert Lieutenant Colonel Wolski was brought to the project in 1889. His investigation confirmed irresponsible contract procedures being employed. Following the formal submission, the government took the coast defence responsibilities out of the Colonial Architect's hands and a Royal Commission of Enquiry was set up to investigate the scandal and report in 1890. The Royal Commission found that Barnett was responsible for mismanagement and insubordination and recommended that the responsible members of his staff be retired or dismissed. The contractor was required to refund over \$6000 and work barred from any further government contracts. Barnett was officially censured and subsequently retired in June 1890. For Sydney's famed Colonial Architect "...this was an ignominious and to a distinguished career, marked by many of Sydney's best known and most magnificent late C19th buildings".

Topography and Public Access

Bare Island had its 'military aesthetic' preserved and relatively undeveloped, as a home for veterans. Since 1967 the site has been under the control of National Parks and Wildlife Service. The coastal climate has also kept the island relatively free of vegetation regrowth, so that the Fort's defensive role, views of the headlands and strategic position will assist the visitor to appreciate its original topography.

Fort Scratchley, NSW

This section provides a comparison of the attributes of Fort Scratchley with the other locations identified by the Comparative Analysis. Comparisons are made under the same headings.

History

The site has figured in the very early settlement history of the first colony. The location of the Hunter River (Nobbys Island) received a brief mention in Captain James Cook's Journal, and the discoverer Shortland's map of the river entrance first describes the headland on which Fort Scratchley stands (Coal River 2008). These early historical associations are also significant in the case of the Sydney Harbour Forts and Bare Island which, in 1770, was noted by Cook and visited by Sir Joseph Banks. The headland was significant for the additional reason that it was the site of the first extraction of coal in Australia.

The headland's role as a maritime signalling station from 1815 -1894 adds to the cultural foundation of the place. The station on Signal Hill was the 2nd coastal signal station after South Head, Sydney, on the east coast of Australia; its function being taken over by the lighthouse on nearby Nobbys in 1914. Most significantly, Fort Scratchley is an excellent representative example of a classical C19th coastal fortification. Its construction resulted from the 1877 Review prepared by Jervois and implemented by Scratchley. In his design of the Fort, Jervois was given a 'clean slate' as there were no previous permanent fortification structures. The result is a fortress structure that is able to exhibit clearly many of the latest British military engineering principles developed up to the 1870/ 1880 period. The Fort is not unique in claiming this, however, as Bare Island Fort, Fort Lytton (Brisbane), Fort Glanville (South Australia) and some of the 1880s Port Phillip Bay forts also exhibit elements of military engineering favoured by Jervois.

Fort Scratchley has the distinction of being 'The only Australian fort to have fired in action at an enemy surface target'. The claim arose from the attack mounted upon the Port of Newcastle by Japanese Submarine 121 on 8 June 1942 when the guns of Fort Scratchley fired 4 rounds of return fire at the submarine. In comparison, the coastal defence forts of other southern

Australian cities saw action only in the form of warning shots for identification of shipping on several occasions.

Dedication of Fort Scratchley

The armed forces vacated Fort Scratchley in 1972. From its first use, known as 'Fort Fiddlesticks' in the 1820s, this represents a service length at this place of 143-152 years. Importantly for Fort Scratchley and in honour of this long service and the Fort's contribution to the defence of Australia, Fort Scratchley was "dedicated to all the serving and ex-service men and women of Australia" in a ceremony conducted by the Prime Minister in 2002. This made the place relevant to anyone who has donned an Australian uniform. No other fort in Australia has received this distinction.

In a close comparison, Fort Queenscliff billed as 'Victoria's Premier coastal Fortress' began with the erection of temporary earthworks in 1861. So while it is still occupied by the army, it has seen a defence role on the site for 146 years.

Fort Scratchley was occupied by 2 museum societies (Military Museum and Maritime Museum) from 1978 to 2003. These tenancies had been moderately successful in managing the site for public use and access. However, there was little maintenance carried out during this period, unlike Fort Queenscliff during the same period.

Ordnance and Technology

Fort Scratchley is a rare example of a fort battery complex which demonstrates the evolving technology of coastal defence from 1880 until the end of WW2. Major ordnance development is demonstrated by the 'layers' of construction evident in various gun positions. The structures which remain are physical evidence of the development of armaments between 1882 and 1945. Changes were made to either install a new generation of ordnance, or to protect the gun crew under changing conditions. Bare Island Fort, while comparable in many ways to Fort Scratchley, was used as an active fort from 1883 to 1902,

and they only had one of its original guns changed in its much shorter defence career.

Structural modifications are also evident in the tunnels and magazines, made to accommodate new ammunition, or to service the new guns when they were changed. Changes in the lighting systems of the tunnels, from candle lamps of the C19th to electric systems of WW2 demonstrate technical developments over half a century of use. The most significant example of structural modification is in the roofing of the open tunnels serving the 3 guns “en barbette” when, in 1889; those 3 positions were updated for disappearing guns. This modification uniquely provided the Fort with fully enclosed fighting areas, and must have given the gun crews much more confidence. Apart from 2 gun pits at Fort Queenscliff that were roofed over to form magazines, there is little evidence in other Australian forts of such major structural rearrangements over a long period.

Structures

The major flanking batteries at Fort Scratchley combine both ‘en barbette’ (open) gun pits to seaward and the outstanding ‘casemates’ (enclosed gun positions) protecting the river entrance. Bare Island Fort is the only other fort in Australia able to demonstrate these 2 styles of gun emplacement on the one site. It differs from Fort Scratchley however, in its symmetry with its 2 flanking batteries ‘en barbette’ protecting the main gun mounted in the armoured casemate. The gallery of 3 casemates at Fort Scratchley is representative of the prevailing, late C19th style of battery construction in the larger British forts, such as Fort Nelson, but is only reflected in 2 of the other Sydney forts, the Upper and Lower batteries at Georges Head.

The 1880s designed tunnel system at Fort Scratchley is of rare quality and a part of the fort that is most highly valued by its local community. The system is extensive and, except for the 1889 roofing of the western passages is quite original. The layout is innovative as the tunnels always run downhill in the direction of loading ammunition, either into the central magazines, or out of them to the deep shell lifts. This feature is not exhibited so clearly in any other Australian fort.

Walls of the original fortifications built at Fort Scratchley in 1882 were constructed in mass concrete. Modifications were made in 1889 to accommodate the 'disappearing guns' and in this instance, concrete across the roof of the tunnels was reinforced with sections of iron railway line of 'bull-head' profile. Similar construction was used at Bare Island Fort, which was 'mostly completed' by 1886. Both forts were very early examples of the use of reinforced concrete in Australia.

The rampant walls of Fort Scratchley, which enhance its external appeal, are built of concrete. The lower walls around fort Drive were constructed in 1885 using mass concrete. The upper, sloping ramparts were constructed of reinforced concrete in 1914 as batter protection. The upper walls and sloping top surface of the Fort is representative of the British 'design factor' that a 'glacis parapet' was found to '...divert the incoming shells over the works themselves'. Fort Scratchley is not alone in displaying this quality; the gun batteries on Middle Head, Sydney Harbour were constructed and modified by Jervois and Scratchley on this principle.

The above ground buildings are also representative of British planning principles, by their placement at the rear wall below expected enemy fire. This location also places garrisoned troops in a position to readily man defensive positions at the rear walls against attack from the landward side. The Fort buildings remain largely intact and the planning arrangement of the complex is generally unchanged since the 1880s.

By comparison: Fort Queenscliff contains a large number of different structures of original condition and great heritage value. The support buildings for Rottnest Island, WA, are located in a central area at Kingstown complete with stylish barracks surrounding a large parade ground. Fort Lytton has only small associated building within the Fort and used the old quarantine station premises outside. The Leighton Battery placed its associated barracks and support facilities well to the rear of the fort. Again, it is Bare Island that shows similarity to Fort Scratchley, with a dense group of support building and small courtyard situated inside the walls at the rear of the fortress. Moreover, it shares the same designer, Barnet, who was able to endow both locations with a consistent building design in harmony with their military settings.

Fort Scratchley's associated buildings, being mostly protected inside the fort walls are highly representative of the various functions required to support a coastal battery. There are barracks, Commandant's Cottage with servant quarters, offices, kitchen, ablution blocks, guard house, searchlight emplacement, generator room and quite uniquely, an armoured laboratory used for preparing gun cartridges. Bare Island is the only other comparable example of a complete self contained battery and barracks complex in Australia, which could provide such a potential for interpretation.

Military Features

Shell Lifts: A very rare and significant engineering feature of Fort Scratchley is the mechanism of 3 iron and chain shell lifts servicing the eastern gun positions from the lowest ends of the tunnels. They are of unusually fine quality and exhibit clever engineering. Believed to date from 1882, they pre-date the automatic shell lifts in WW2 gun emplacements for 9.2 inch guns at North Fort and Rottnest Island. Similar shell lifts appear not to have been fitted to any other 19th Australian fort.

Tunnel Lighting: the tunnel lighting system at Fort Scratchley is of particular quality and significance, even on a world scale. The main feature of significance is the finely crafted brass frames with protective mesh, which were fitted to main passageways throughout the tunnels. This compares only with the better quality lamp recesses at Fort Nelson, UK or some of the magazine lamp recesses at Fort Queenscliff. The candle-operated passage lamps that were originally installed have been identified and 6 'Wall Lamps' reconstructed.

Casemate Lighting: Another rare asset of the Fort has been the world-class reconstruction of the 'Tremlett's Pattern Fighting Lamp' which is solidly designed and mounted to resist breakage in the casemates. Although this was the standard lamp for casemates, only Fort Scratchley in Australia has them. The restoration of a further 20 or so, lamp recesses, with lamps fitted to simulate the original ambiance of the tunnels presents a future opportunity for a very unique interpretive experience

Gun Control Systems: Gun control systems are a feature often lost, or misunderstood in the conservation of forts. At Fort Scratchley, it is still possible to interpret changes made in the systems used for directing fire of a gun

battery. Evidence remains of depression Range Finders of the 1880s; the extended Battery Observation Post of WW1-2; and even of the later WW2 radar directing station at nearby Shepherds Hill. Such evidence also exists amongst the many Sydney fortifications, but is not so conveniently able to be interpreted at 1 location.

Battery Observation Post: this building is intact and is a dominant structure of the upper parade ground, west of Gun 2. The operations carried out inside other battery Observation Posts are interpreted in reconstructed Battery Observation Posts at the Leighton battery and at Fort Talaroa, New Zealand. Fort Scratchley has a unique opportunity to do the same within an existing structure. The BOP is one of the most intact in any Australian fort. Fort Scratchley is unique in retaining the essential elements of the battery complex, including guns, searchlight station, signal mast, all of which were controlled from the BOP. It is more complete and intact than 2 similar BOPS located at another nearby coastal battery, North fort on North Head in Sydney.

Mines Firing Station: The mines firing station attached directly to Fort Scratchley is a rare element not often obvious in Australian forts. A mines firing station was constructed at Fort Scratchley to control the mines laid as part of the Jervis master plan, across the entrance to the port of Newcastle. It represents an excellent example of a C19th defence principle that submarine mines and obstructions placed in a channel are usually used in close conjunction with nearby forts and are often regarded as the major defensive elements. In some instances as in the casemated Upper and Lower Batteries at Georges Head, the guns are there as an adjunct and protection for the underwater defences. A comparable example of the joint use of mines is that seen at Fort Lytton when mines defending the Brisbane River were controlled from separate bunkers built within the fort area. The fort Scratchley facility, being partially protected by the walls of the fort, has a clear view of the Cornish boat Harbour from where the mines were laid.

Association with Eminent Persons

During its construction, the Fort was known as Newcastle Fort, and it was only after Sir Peter Scratchley's death that it was renamed in his honour. The naming identifies a very close association of the Fort with this C19th British

royal Engineer who, following the principles developed by sir William Jervois (Jervois 1877) advised on the detailed design and construction of the Fort.

In the same manner, the Fort's reputation is greatly enhanced by its association with Jervois as strategic designer. Jervois had the reputation, at the time, of being Britain's and possibly one of the western world's greatest coastal defence experts (Saunders 1989). The Colonial Architect of NSW, James Barnet, responsible for many of the colonial buildings of which Sydney is proud, is associated with the building of Fort Scratchley. It was in his offices that the designs were prepared and the contract for works administered. Bare Island Fort also has this same distinction in designers and builders. The controversy involving Barnet during the construction of Bare Island was unrelated to Fort Scratchley. The work of the Colonial Architect at Fort Scratchley is undiminished and is of great importance.

Topography and Public Access

Fort Scratchley's prominent position on a hill above the second largest city in NSW gives it enormous prominence and recognition. It provides visitors with unequalled views of Newcastle and its port from the fort buildings and ramparts, with panoramic views of the city from the western balconies. It is easily accessible, on foot from the city. The Fort is a prominent feature viewed from the city of Newcastle. The verandahs of the barracks buildings, The Commandant's Cottage, the fort walls and elevated position of the hill with the signal mast behind, are features of a city icon.

The aesthetic of the Fort to a visitor is that of a classical, almost stereotypical fortress. On approach to the Fort from seaward, its appearance is formidable and impressive. Wide rampart walls face the hillside, which is topped by signal masts, a small observation post and is edged by the outline of 2 guns. On a landward approach from Parnell Place, a winding road leads up a bare, grassy slope to solid walls of the Fort. Advancing further, a visitor is aware of the crenellated and loopholed walls designed for defensive fire. Finally, across the concrete walled dry ditch under the walls, a wooden ramp allows approach to a solid main gate, surrounded by high stone posts.

The approaches to the Fort retain many of their qualities which would have existed in the 1880s. The minimal vegetation, cleared for the purpose of both

sighting and fire of the guns, also helped to prevent damage from fire either due to enemy action, or the burning debris from friendly fire and was a necessary characteristic of gun batteries. There are many Australian colonial forts which have lost this aesthetic: Kangaroo Bluff battery (1884), situated across the Derwent River to protect Hobart, and the Princess royal battery (Albany WA) are examples of this. Unfortunately, from the viewpoint of military historians, Australian coastal fortifications under the care of national park authorities such as many of those in Sydney Harbour, tend to favour the conservation and even re-establishment of denser vegetation on areas that had been previously cleared for the operation of these military installations.

Very few of the Australian coastal fortifications can compare with the classical military aesthetic demonstrated by Fort Scratchley. Fort Queenscliff in Victoria, however, also has a military aesthetic, enhanced by the fact that the Fort is still under the control of the Australian Armed Forces (Museum 1994). This fort also characterizes any of the classical design features of a fortress, especially on its landward approach.

The Future

The above examples are iconic sites with extremely high heritage values. In all cases the locations are close to centres of population in scenic locations with potential for tourism and recreation. The sites are therefore highly desirable and under pressure for redevelopment for other purposes. The future protection of these historic military icons is dependent on recognition of the significance of these places to prevent development which undermines their heritage values.

Fort Scratchley has excellent potential as an educational and tourist attraction for the city of Newcastle, continuing the recommended theme of 'A Museum of Itself'. Resources and sustainability are key issues. These issues are addressed in the above examples by strong partnerships and use of community and volunteer groups. In relation to the latter, Fort Scratchley is supported by the Fort Scratchley Historical Society Inc., a group which has demonstrated commitment and resourcefulness throughout 27 years of association with the Fort. The group have planned further restoration of the gun emplacements, a disappearing gun into gun Emplacement 2 and restoration of Gun

Emplacement 1 to the earliest 'open pit' period. This will highlight the layers of military heritage for which Fort Scratchley is highly valued.

Conclusion. Overall this comparative analysis highlights the special heritage values of Fort Scratchley and the uniqueness of this site as an example of closed coastal Fort installation of the late C19th. All examples of the sites described are significant for many similar qualities, but Fort Scratchley has outstanding significance as the most intact and comprehensive complex of British Colonial military engineering in Australia.

Factors which contribute to this assessment include the following:

- It is a complete and intact example of a closed fort with dry ditch, based on established British design principles.
- It displays the built alterations required to accommodate changing technology, providing evidence of these layering of changing and improving military technology during a comparatively long period of military deployment.
- The tunnel system retains many military features unique to this site.
- It is complete and self contained military complex with living quarters, including barracks and services for personnel.
- It has a military service record that includes engaging with the enemy.
- It is uniquely located on a high coastal flank, constructed in defence of a port and city, easily accessible to the public, close to transport in a major city centre.

Prior to the establishment of the fort, this site has historic and cultural significance in relation to the penal settlement of Newcastle, the earliest extraction of coal in Newcastle, earlier gun emplacements and maritime functions overlooking the port.”²²

²² Fort Scratchley Historic Site, Newcastle- Heritage Management Plan, May 2008. Suters Architects in association with Dawbin Architects, Heritage Consultants.



Figure 13 Military Personnel in front of the Barracks building 1890s, Photo -courtesy of FS Historical Society

5. ASSESSMENT OF SIGNIFICANCE

Without doubt Newcastle's most spectacular vantage point, Fort Scratchley commands a significant position overlooking the Hunter River Estuary, coastline and Nobbys Headland. It is a site of outstanding heritage significance, listed as part of the Coal River Precinct on the NSW State heritage Register and the Newcastle Local Environment Plan 2012.

Signal Hill, which became Fort Scratchley was the site of the first European coal mine in Australia and the site of a coal-fired navigation beacon. It was a strategic fort for over 150 years and is Australia's only coastal fortification to engage with an enemy Naval vessel firing 2 salvoes at a Japanese submarine that bombarded Newcastle with about 2 dozen shells during World War 2.

The ownership of Fort Scratchley Historic site was transferred to the City of Newcastle from the Commonwealth Government in June 2008. Council is responsible for protecting the values of the site. The Fort Scratchley Historical Society take care of the day to day operations, including maintenance, manning the museum and conducting tunnel tours. The fort is open 6 days/week and the volunteers of the historical society are very committed and dedicated to the responsibility of the fort's presentation to the public.

Nearby Fort Scratchley is Shepherds Hill of which the fort was part of the coastal defence group and "Shepherds Hill Group is historically significant at a State and possibly a national level, because its history forms an important part of the story of Australian coastal defences, spanning a six-decade period from the late 19th to the mid 20th century. During this time, the site was a key defence post. Its history provides an insight into the way that NSW defence policy reacted to changing technologies, threats and types of warfare. During WWII, the fortifications at Shepherds Hill played a co-ordinating role in the defence of Newcastle. Defence of Newcastle during this time was of high significance to the state, because Newcastle had become an area of great strategic and industrial importance in NSW, with its steelworks and operational port. The majority of the state's shells were produced in Newcastle and it was also the site of the NSW Dockyards. In order to protect these productions, a new system of defence was undertaken, which included the strengthening of Fort Wallis and the construction of two new close defence batteries - Shepherd's Hill and Fort Scratchley. The defence system proved its worth when in June 1942, Newcastle was fired on by cruising Japanese submarines, and Newcastle gained the distinction of being the only place in Australia that returned enemy fire with the launching of guns from Fort Scratchley. The fact that the Shepherds Hill fortification was simultaneously manned by members

of the Navy, Army and the Air force for a variety of functions is rare, and possibly unique in Australia.”²³

Assessment of significance

- **Historical significance-** see history section page
- **Historic individuals – Jervois and Scratchley, Colonial Architect James Barnet.** See Appendix B for Wikipedia Biography of Scratchley and associated newspaper reports. Jervois, Scratchley and Barnet are mentioned throughout this proposal, particularly in the Comparative Analysis section.
- **Creative or Technical Achievement –** see Defence Scheme and Engineering Evolution section- pages
- **Research potential-** NCC management plan, Coal River Precinct – University of Newcastle Living Histories, Fort Scratchley Historical Society, Wyness and Graham architectural theses- provide thorough documentation of the site.
- **Social-** the Newcastle community has held the Fort as integral to its sense of identity over a long period of time.
- **Rarity-** Fort Scratchley is the most intact of the forts designed and built under the auspices of Jervois and Scratchley.
- **Representativeness –** an excellent example of British military construction of C19th.
- **Integrity/ Intactness-** Whilst some original elements of the fort have been modified over time to accommodate the evolution of military technology development, the fabric of the fort has been maintained and most of it is in excellent condition.
- **Statement of significance-** see statement under ‘Assessment of Significance’
- **Area of significance-** Coal River precinct has state heritage listing and Shepherds Hill Defence Group Military Installation application for state heritage listing is to be endorsed (SNR- No01806) and is registered under LEP 2012- Item 460. Fort Scratchley is an integral component of

²³ J. Carr. Heritage application to NSW Heritage and Environment for ‘Shepherd’s Hill defence Group Military Installations. July 2010.

both these groups. The Coal River Precinct is currently applying for national recognition. This EA heritage proposal is applying for national recognition for Fort Scratchley.



Figure 14 Remembrance Day 2018 at FS. Photo- courtesy of FS Historical Society. Note the display of crafted poppies.

6. INTERPRETATION PANEL

General Approach

A marking ceremony is anticipated. There has been positive support from Newcastle City Council (the Owner) as well as the Fort Scratchley Historical Society. An interpretation panel would ideally be erected, inside the main fort gates and visible to pedestrians on entry to the fort complex.

The Interpretation Panel

The panel should include the following characteristics

1. A title “ Fort Scratchley”.
2. Logos of Engineers Australia and Newcastle City Council.
3. A small scale representation of the EHA marker plate.
4. The date and other details of the marking ceremony.
5. Body text should be 24 point Arial Bold.
6. A map showing the location of the Fort covering the Newcastle coastal area.
7. At least 4 images with brief captions.
8. Total text should not exceed 500 words excluding headings.
9. Size should nominally 1200 mm wide by 600 mm high.
10. The panel to be constructed of vitreous enamel-on-steel plate as per EHA standard drawings.
11. The panel to be mounted on a steel free-standing frame as per EHA standard drawings.
12. The EHA marker to be mounted below the interpretation panel as per EHA standard drawings.

Possible Interpretation themes for Interpretation Panel

- a. Awabakal people – traditional owners of this site
- b. From Australia’s first coal mine to landmark fort construction
- c. The Japanese attack in WW2
- d. People who worked and lived at the Fort during operation
- e. Anzac Day and Remembrance Day commemorations

7. References

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- Scratchley, P & Jervois, W. "Scratchley Report on Coastal Defences of NSW & Other Colonies". 1877.
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- Carr, J. Heritage application to NSW Heritage and Environment for "Shepherd's Hill Defence Group Military Installations". July 2010.
- Coal River Working Party, c/- University of Newcastle 2005.
- Hadlow, M. Documentary by 2NUR-FM, "War on the Doorstep- The Japanese Attack on Newcastle, 8 June, 1941". 1979

APPENDICES.

Appendix A- Letter of approval

Appendix B – Lieutenant Colonel Peter Scratchley- Wikipedia references and Newspaper Obituary

Appendix C- Other Historical Records

1. Coffey Coal River Report on Investigation of Convict Coal Workings – 2005
Full report can be viewed on
<https://downloads.newcastle.edu.au/library/cultural%20collections/pdf/coffeys.pdf>
2. Drawings from 1881 including copies of blue prints.
3. Builder- Photo of James Russell

APPENDIX A. Letter of Approval – Newcastle City Council

Museum, JBaird, KT
Phone: 02 4974 1415



23 August 2019

Merv Lindsay
Engineers Australia
Suite 3, Tonella Commercial Centre
125 Bull Street
NEWCASTLE WEST NSW 2302

ENGINEERING HERITAGE RECOGNITION OF FORT SCRATCHLEY

Thank you for your recent letter seeking formal approval for Engineering Heritage Newcastle to propose Fort Scratchley be recognised for engineering excellence.

I am providing approval for the proposed recognition of Fort Scratchley with commemorative panel and marker.

This approval is on the basis that Engineering Heritage Newcastle allows the Director of Newcastle Museum and the President of Fort Scratchley Historical Society final approval of the commemorative panel.

Please remain in contact with both parties for sign off on this recognition plaque.

Should you require any further information on this matter please contact me or (02) 4974 1415 or by email at jbaird@ncc.newcastle.nsw.gov.au.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Julie Baird', written in a cursive style.

Julie Baird
DIRECTOR, NEWCASTLE MUSEUM

APPENDIX B- BIOGRAPHY LIEUTENANT COLONEL PETER SCRATCHLEY

4/2/2016

Peter Scratchley - Wikipedia

WIKIPEDIA

Peter Scratchley

Major General Sir Peter Henry Scratchley KCMG (24 August 1835 – 2 December 1885) was special commissioner for Great Britain in New Guinea 1884–1885 and defence adviser for Australia.^[1]

Contents

Biography

Honours

References

Further reading

Biography


Scratchley was born in Paris, thirteenth child of Dr James Scratchley, Royal Artillery, and his wife Maria, née Roberts.^[1] He was educated in Paris and at the Warwich academy and then began a career as an Officer of Engineers in the British Army. Scratchley served in the Crimea and Indian Mutiny and in October 1859 was made a captain. He then had several tours of duty in the Australian colonies advising on defence. In 1860 he was sent to Victoria to plan a system of defence for that colony, but after working on this for over three years his plan was not adopted as a whole. Scratchley had, however, constructed batteries around the coast of Port Phillip by expending a comparatively small sum.^{[1][2]}

Following the withdrawal in 1860 of British garrison troops from Australia, Major General Sir William Jervois and then Lieutenant Colonel Scratchley were commissioned by a group of colonies to advise on defence matters. They inspected each colony's defences and produced the Jervois-Scratchley reports of 1877. Not surprisingly given their engineering backgrounds and the fear in the colonies of potential enemy fleets, the reports emphasised fortifications against naval attack. The Jervois-Scratchley reports formed the basis of defence planning in Australia and New Zealand for the next 30 years.^[2]

Among his achievements in Australia were:

- Founding of the Corps of Engineers in Victoria in 1860
- The fort on Bare Island, Botany Bay, New South Wales^[3]
- Fort Scratchley, Newcastle, New South Wales
- Fort Lytton, Brisbane, Queensland
- Fort Glenville, South Australia — assisted by Alexander John Moncrieff
- Fort Queenscliff, Queenscliff, Victoria

Sir Peter Scratchley



Born	24 August 1835 <div>Paris, France</div>
Died	2 December 1885 <div>(aged 50)</div> <div>Near Papua New Guinea</div>
Buried	Old Chertsey cemetery, England
Allegiance	 United Kingdom
Service/branch	British Army
Years of service	1854–1882 ^{[1][2]}
Rank	Major General
Battles/wars	Crimean War Indian Rebellion of 1857
Awards	Knight Commander of the Order of St Michael and St George
Other work	Special Commissioner for Great Britain in New Guinea

https://en.wikipedia.org/wiki/Peter_Scratchley

1/2

Scratchley retired with the honorary rank of Major-General on 1 October 1882, but was still employed as defence adviser for Australia by the Colonial Office. He was appointed special commissioner for Great Britain in New Guinea in 1884, and arrived there in August 1885. Port Moresby was made the seat of government, questions of land tenure and the cultivation of the land were examined, and good relations were established with many of the natives and with the missionaries. Scratchley soon contracted malaria and died at sea on aboard the *Governor Blackall* on 2 December 1885. He was buried in Melbourne and then reinterred in the Old Chilton cemetery in England. He left a widow, two daughters and a son.^[1]



Governor Blackall, c. 1870.

Honours

Scratchley was created a Knight Commander of the Order of St Michael and St George in June 1883.^[1]

Scratchley Road in Port Moresby, Mount Scratchley in the Owen Stanley Range near Kokoda in Papua New Guinea, and Port Scratchley in Newcastle are named in his honour.^[1]

References

- ↑ Jones, R. B. (1975). "Scratchley, Sir Peter Henry (1835–1885)" (http://www.adb.online.anu.edu.au/biogs/A060113b.htm). *Australian Dictionary of Biography*. Canberra: Australian National University. Retrieved 2019-01-15.
- ↑ Serie, Penelope (1988). "Scratchley, Peter" (http://gulenborg.ncl.au/ebooks15/50C721h/0-dict-biogSa-Sp.html#rscratchley1). *Dictionary of Australian Biography*. Sydney: Angus and Robertson. Retrieved 2018-11-15.
- ↑ "Bare Island Fort" (http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5645621). *New South Wales State Heritage Register*. Office of Environment and Heritage. Retrieved 8 October 2019.

Further reading

- Kinloch Cooke, G. *Peter Scratchley: Australian Discoveries and New Guinea*. Elton Classics. "Compiled from the papers of the late Major-General Sir Peter Scratchley"

	Government offices	
New creation	Special Commissioner of British New Guinea <div>1884–1885</div>	Succeeded by <div>Hugh Hastings Romilly<div>(acting)</div></div>

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the late Sir Peter Scratchley, High Commissioner of New Guinea, was born in Perth in 1835, was the younger son of the late Dr. J. Scratchley, Royal Artillery, who was educated at the Royal Military Academy, Woolwich, from which he passed out at the head of his batch, and received a commission as Second Lieutenant in the 1st Battalion of the Royal Artillery. He was educated at the Royal Military Academy, Woolwich, from which he passed out at the head of his batch, and received a commission as Second Lieutenant in the 1st Battalion of the Royal Artillery. He was educated at the Royal Military Academy, Woolwich, from which he passed out at the head of his batch, and received a commission as Second Lieutenant in the 1st Battalion of the Royal Artillery.

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Wed 9 Dec 1885 - The Telegraph and Commercial News (Perth, WA : 1855 - 1901)

Page 2 THE LATE SIR PETER SCRATCHLEY

THE LATE SIR PETER

SCRATCHLEY.

Our telegraphic news announces the death of Sir Peter Scratchley, High Commissioner of New Guinea. The following record of the late distinguished gentleman's career will, we feel sure, be perused by our readers with much interest. Scratchley, Major-General P. H. - Brevet Major-General, born in Perth in 1835, was the younger son of the late Dr. J. Scratchley, Royal Artillery; was educated at the Royal Military Academy, Woolwich, from which he passed out at the head of his batch, and received a commission as Second Lieutenant in the

<https://trove.nla.gov.au/newspaper/article/6074608>

Worcester, which office he held until March, 1877, when he was seconded by the Earl of Carnarvon, upon the recommendation of the Secretary of State for War, to proceed to Australia for the purpose of acting as assistant to His Excellency Major-General Sir W. Jervois in advising the Government upon the defences of those colonies. During an employment extending over twelve years under the War Office (during which time he was promoted to the rank of Brigadier-General on 10th February 1894), he had charge, as building engineer and architect, of extensive engineering works connected with the great arsenal and store depot at Woolwich, the School of Gunnery at Shoeburyness, and the various forts, batteries, and small arms, etc. For many years, also, Colonel Scratchley acted as military adviser to the Agent-General of Victoria in London, and was Commissioner of Defence for the Colonies of Victoria, New South Wales, Queensland, Tasmania, and South Australia. Colonel Scratchley had the war medals for the Crimea and India. In 1878 he received the rank of Colonel, and in 1882 was appointed by the Imperial Government to visit Australia to report upon the defences of defence for the various Colonies. Subsequently he was promoted to the rank of Major-General, and was afterwards appointed High Commissioner over the Island of New Guinea, which position he held at the time of his death.

Appendix C

1. Coffey Report- Coal River precinct

N087M901-AB - R3L1K1W
30 November 2005

Coal River Working Party
c/o School of Liberal Arts
University of Newcastle
University Drive
CALLAGHAN NSW 2308

Attention: Dr Erik Eklund

Dear Sir:

RE: INVESTIGATION OF CONVICT COAL MINE WORKINGS
BENEATH COLLIERIES' POINT, NEWCASTLE EAST
RESULTS OF DRILLING INVESTIGATION

1. INTRODUCTION

After two years of effort to arrange all necessary permits from the State, Federal and Local Governments, the drilling to confirm the existence of the first coal mine in Australia and probably the Southern Hemisphere was carried out on 26 September 2005.

The position of the boreholes were to coincide with the locations of the three drift entries identified by the surveyors, Monseath & Powys Pty Ltd, from an early plan of Flag-Staff Hill Newcastle (1856) Archives Authority Map No. 4604.

The drilling was carried out by Pugsley Boring Services using an Ingersoll Rand L14690 percussion drilling machine. The drilling rig uses air to flush the cuttings from the hole. This particular drilling rig was chosen due to:

- The rigs ability to drill holes efficiently at any angle;
- The rigs ability to drill through all materials including concrete, soil, rock and coal;
- The rig using air to flush the cuttings from the hole (a highly desirable process to avoid wedging or disrupting the existing condition of these heritage facilities);
- The rigs ability to drill to a depth of up to 25m in a short time (20 minutes);

As a precaution against encountering explosive gases in the mine workings Col Dineen of Coalmining Pty Ltd volunteered to check methane levels during the progress of the drilling. A representative of the Department of Mineral Resources was also present during the drilling. Workforce International provided Traffic Control around the worksite.

Viewing of the boreholes using a CCTV down hole camera was arranged for 30 September 2005. The equipment consisted of a Piezomart camera, supplied by Coates Hire. The camera's lens is surrounded by LEDs, which can provide sufficient light in a confined space, but supplementary lights are required for large spaces;

Media coverage on both occasions was organised by Gianni Di Gravio.

Coffey Geosciences Pty Ltd (incorporated)

10 Kingsmead Lane
R50/2300 Newcastle
Phone: 0810 400 1507
Fax: 0810 400 1502
Email: newcastle@coffey.com.au



2 RESULTS OF DRILLING

2.1 Drift 1, Borehole BH1

The first borehole, BH1, was located at the southern most entry, Drift 1, where the coal seam was expected to be below the road level of Fort Drive. BH1 was drilled at a height of 1.35m above road level and as the concrete ramparts angle down at 21° to the horizontal:

The drill penetrated about 0.5m of concrete, then about 2m of weathered Silstone before encountering COAL that continued for a distance of 4.2m from the entry point.

At 4.2m the drill encountered a VOID through which the drilling rods could penetrate without the need for the percussion drilling techniques used for drilling through hard material for a total distance of 5.9m from the surface of the rampart.

The methane gas level in the borehole was found to be only 0.1% methane that indicates no significant risk of the presence of explosive gases.

The drill had exposed the coal mine, which had been concealed for 120 years after the entries were sealed in 1965 during construction of the lower ramparts of Fort Scratchley.

The log of the borehole is attached and a section through the borehole is shown on Figure 1.

The coal seam is essentially horizontal and after correcting for the angle of dip of the BH1 (21°) the void would be about 1.4m high with about 0.6m of coal left in the roof. This agrees with historical data nearby. Borehole records that indicate that the coal seam was about 2m high and that only the lower 1.4m was mined. It was reported that the upper 0.6m was inferior coal and was generally not mined.

The borehole was cased for a distance of 4.5m to support the hole and allow access to the void by a down the hole video camera.

2.2 Drift 2, Borehole BH2 and BH3

Flushed with the success of encountering the mine workings in the first hole the rig was moved to the location of Drift 2.

BH2 at Drift 2 was drilled at an angle of 17° from a height of 1.6m above road level.

The drilling encountered about 3.5 of concrete before penetrating about 4m of fill and silstone. Coal was encountered at about 8m from the face and extended to 6.7m where a void was encountered. The void was less than 2m wide before reaching refusal to push from the drilling rig. The void appeared to be partly full of debris. Again the coal seam was about 2m thick with the elevation of the seam being similar to that of the nearby borehole. This is illustrated on Figure 2 attached.

BH3 was drilled at a steeper angle of 26° in an attempt to intersect the void closer to the face. Again a small void was encountered at a similar elevation as at BH2, but closer to the face of the ramparts.

Casing was inserted into both boreholes to maintain the hole until the video camera was available.

2.3 Drift 3, Borehole BH4 and BH5

BH4 at Drift 3, the most northerly drift near the roundabout was drilled at an angle of 17°. The borehole encountered a small coal seam, but since some doubt remained as to its correct identification the borehole was continued to a total length of 25m without encountering another coal seam. The borehole had apparently passed through the base of the coal seam.

BH5 was designed to be a low angle (2°) borehole drilled from a height of 2.1 m to intersect the coal seam over a considerable horizontal distance.

The coal seam was first encountered at a distance of 2.5 m and continued to about 10.4 m where a void was encountered, apparently about 1 m wide. The geometry of these two boreholes is illustrated in Figure 3.

Casing was inserted into BH5 but since no void was encountered in BH4 the entry hole was grouted up.

3. VIEWING OF BOREHOLES WITH CCTV CAMERA

The camera was first inserted into BH1, but instead of finding open void, the workings appeared to have been filled with soil and rock. The borehole however did encounter some voids. The borehole appears to be aligned adjacent to and parallel with the northern (right) side of the drift where the filling is incomplete or the fill has settled away from the roof and sides. The material in the roof and on the right side of the borehole appears to be intact coal. The edge of the workings do not appear to be vertical, but are undercut possibly in an attempt to extract the better quality lower coal. The camera was able to penetrate for a distance of 8.7 m where the drill encountered the coal lot in the floor of the seam. The geometry of the drilling Padlogs confirms that the borehole penetrated to the floor of the 2m coal seam at a similar level as that found in the nearby borehole SCA1.

The camera in BH2 also found that the mine workings had been extensively filled with backfill with some voids present adjacent to the edge of the workings. The camera broke into a void that appeared to be a void or working extending off to the left. Again the borehole appears to indicate that the right side contains some intact material suggesting that the centre of the drift is to the left.

Unfortunately in BH3 the casing was blocked with debris that precluded entry of the camera or light, in attempt to better establish the extent of the workings in the area.

In BH5 the void was 10.4 m inside the hill at a low angle (2°) and the void was more extensive and again appeared to extend towards the left. Impact coal with clay seams could be viewed directly ahead of the camera with some intact coal in the roof.

4. CONCLUSIONS

The drilling and camera viewing of the boreholes indicates that:

- Extensive workings are present in the coal seam beneath Fort Scratchley (Colliers' Point);
- The coal seam has been identified as the Upper Split of the Dudley (or Dirty) Seam;
- The coal seam is 2m thick and generally the lower 1.4m of the coal seam was mined;
- Workings were encountered at the three identified drill locations;
- The workings have been backfilled with fill brought into the mine from outside, probably as part of the sealing of the workings in 1985, to provide support for the fortifications of Fort Scratchley;
- The filling appears, at least in the Drill 3 location, to extend at least about 10m from the drift;
- The extent of the filling within the workings is unknown, but complete filling of all the workings.

was probably not possible and extensive voids probably remain under the majority of the hill.

- Further investigations consisting of drilling low angle to horizontal holes from Fort Drive could establish the extent of voids.

Drilling vertical holes from within Fort Scratchley or in Nobby Road could also be carried out to assess the extent of the mining and remaining voids.

It is interesting to note that the workings may extend to the west beneath Nobbys Road since it has recently become known that a void was encountered during the drilling of some of the pier piles beneath the units on the western side of Nobbys Road.

Further research and field investigations are required to expand our knowledge of these important workings.

5. ACKNOWLEDGEMENTS

The successful drilling program would not have been possible without the support and enthusiasm of many of our suppliers and supporters including:

- Pugsley Blasting Services – Daniel Broadbridge – Supplier of the LME90 percussion drilling rig;
- Coates Hire – Supplier of the CCTV down hole video camera;
- Workforce International – Supply of Traffic Management Plan for the traffic control;
- Coalmine Consulting – Colin Donegan – For carrying out the gas monitoring during the drilling of the coreholes;
- Monaghan & Powys Pty Ltd – Research and survey of the drift entries and the coreholes;
- Industrial Heritage – Bob Cook – for video recording the drilling and camera work;
- Newcastle City Council for their cooperation on the day of the drilling;
- Our friends from the media including ABC Radio, NBV Television, Daily Telegraph and Newcastle Herald;
- Department of Mineral Resources – Graham Cowan;
- Members and supporters of the Coal River Working Party particularly:
 - Erik Leland who deciminally drove through the approval process;
 - Geoff D. Greig who managed the media exposure before, during and after the drilling and camera work allowing us to proceed with the onsite work.
- Staff of Coffey Geosciences Pty Ltd who donated their time to this exciting project.
- Many other supporters too numerous to mention individually.

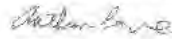
Coffey

N0570810-A0
30 November 2005

5

If you have any questions regarding this matter please contact the undersigned.

For and on behalf of
COFFEY GEOSCIENCES PTY LTD



ARTHUR LOVE

APPENDICES

- A Notes and Video Recording
- B Logs of Boreholes
- C Photos – Pages 1 to 3

DRAWINGS

N0570810C1-1
Figures 1 to 3

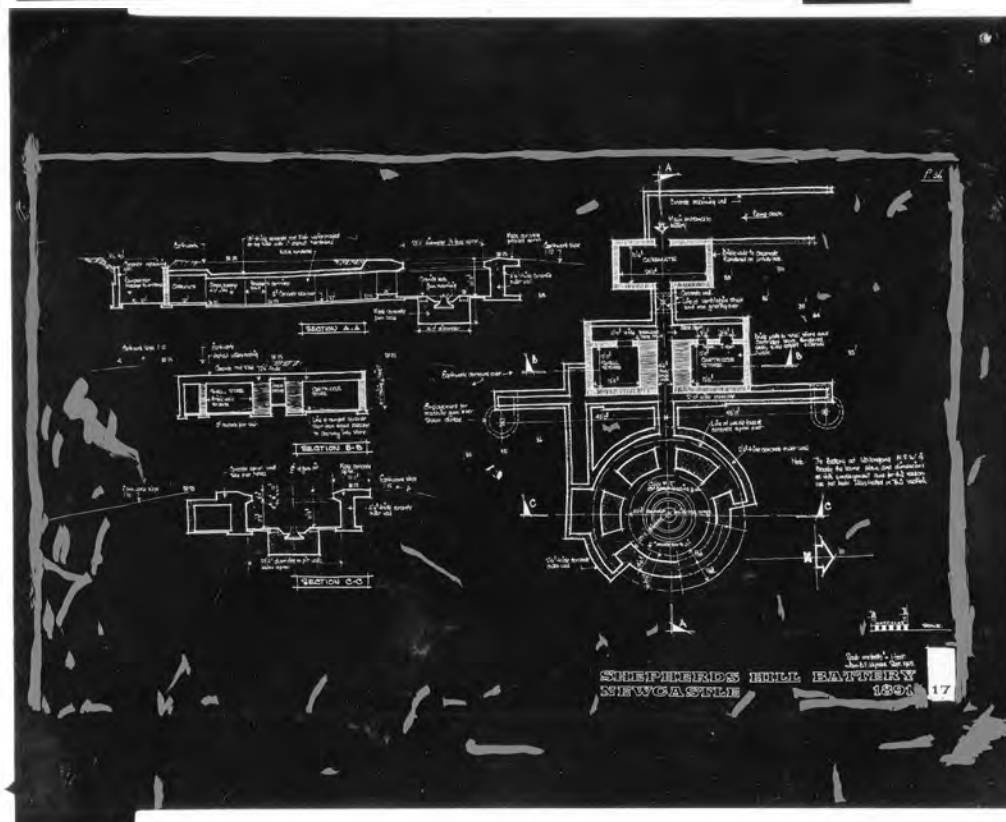
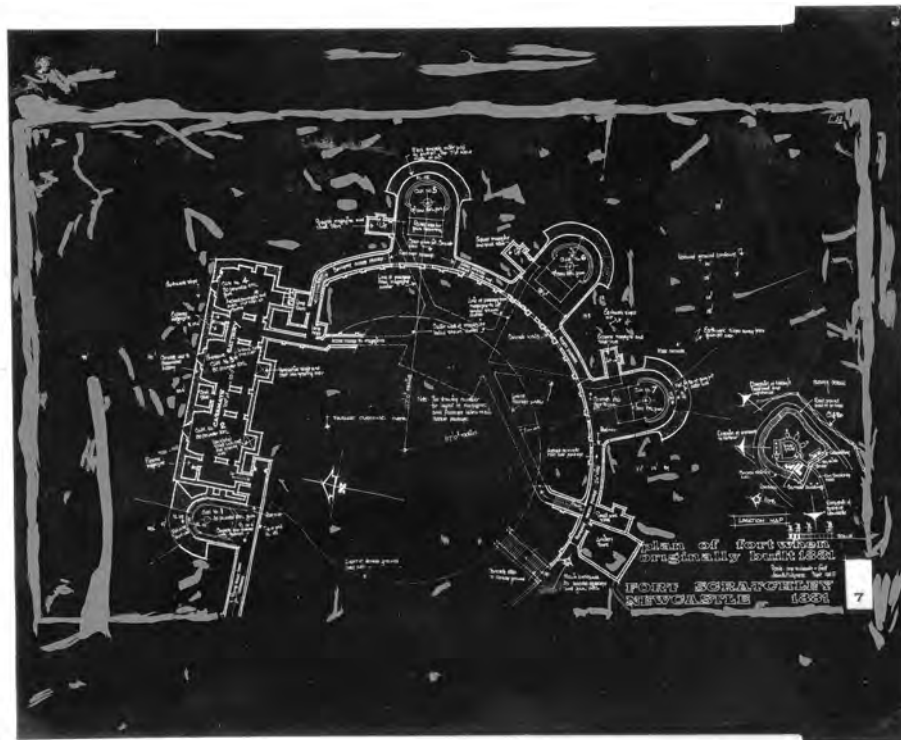
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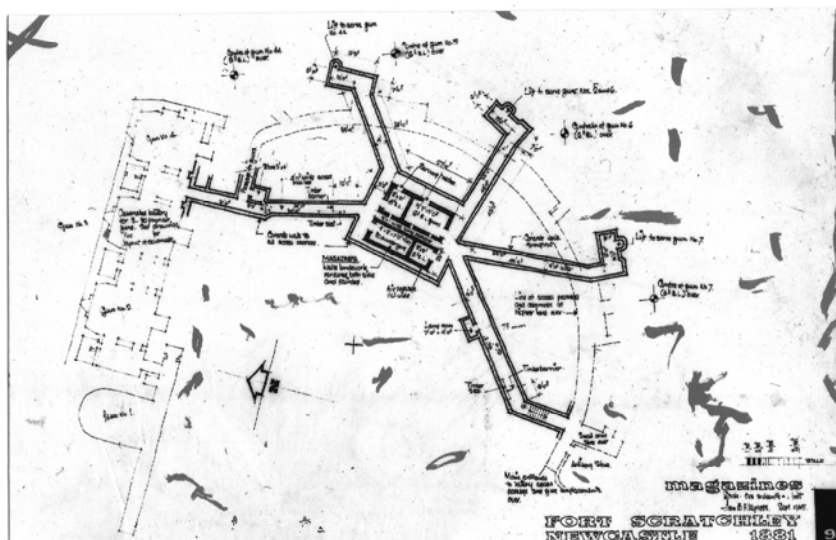
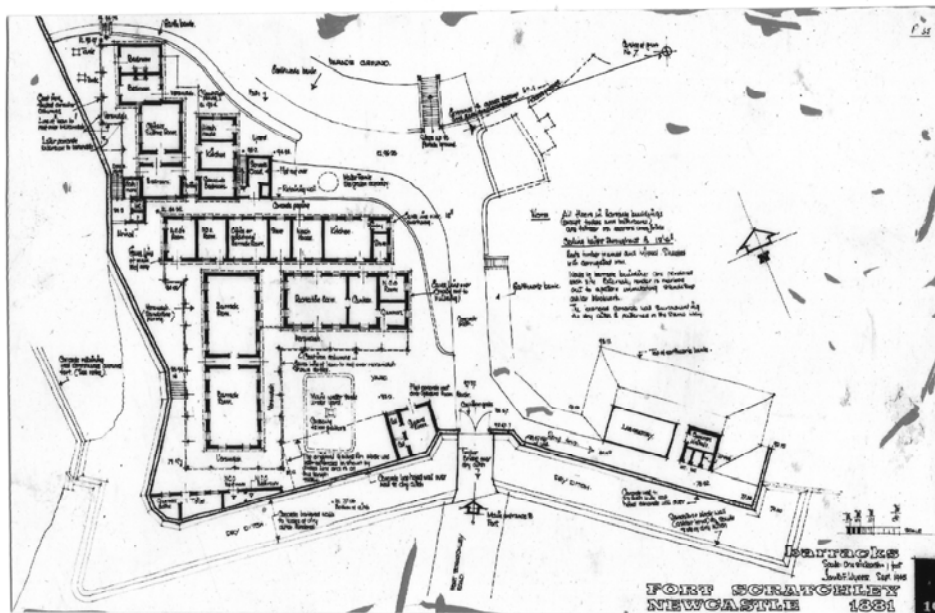
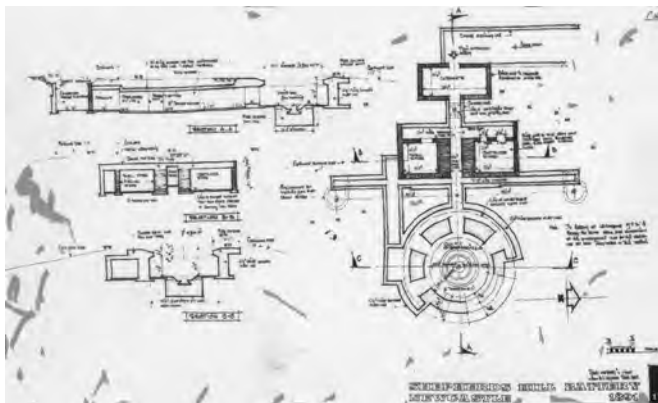
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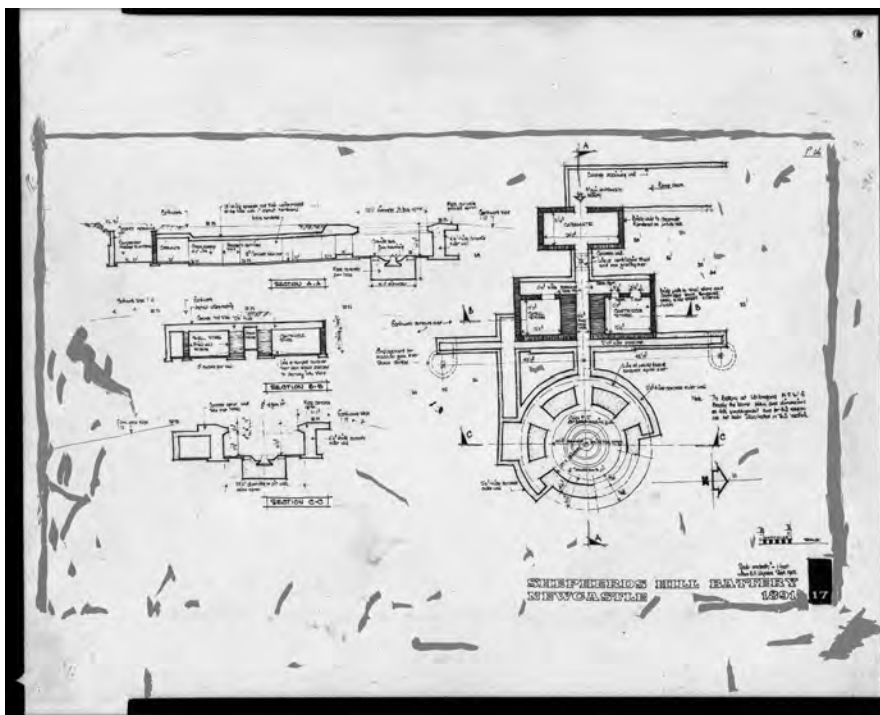
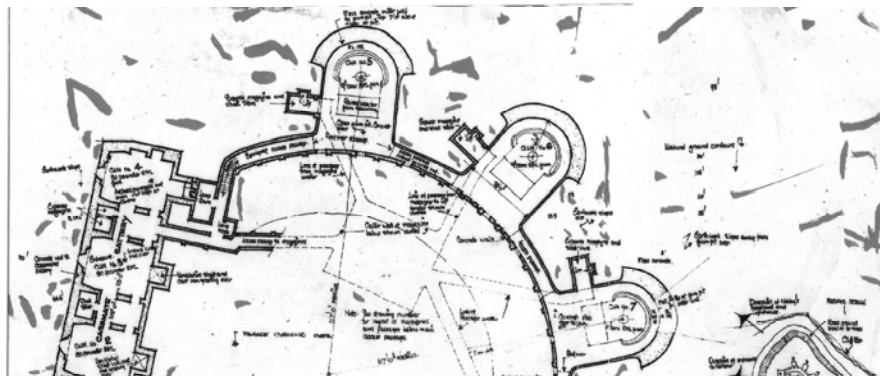
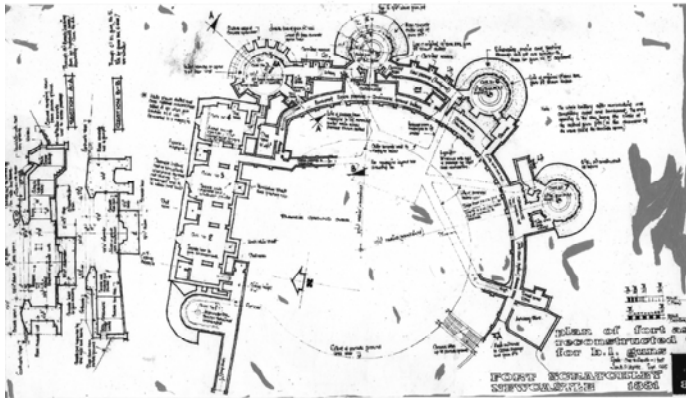

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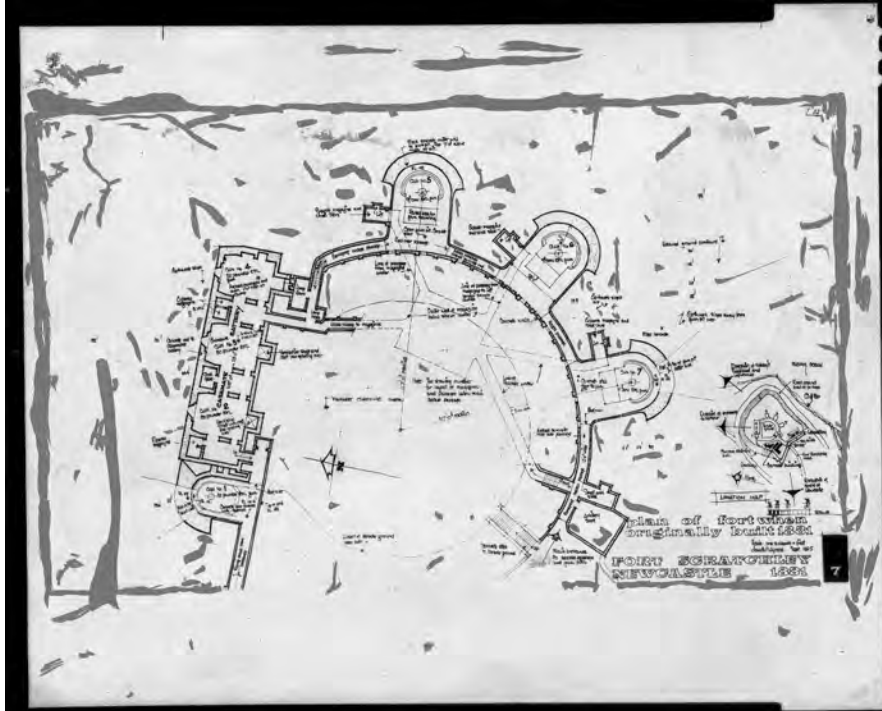
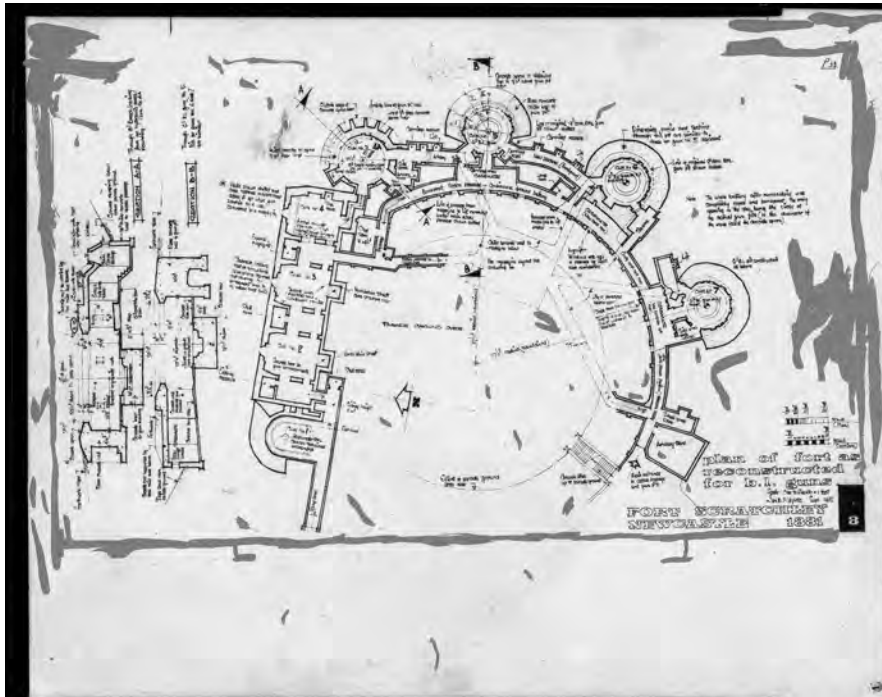
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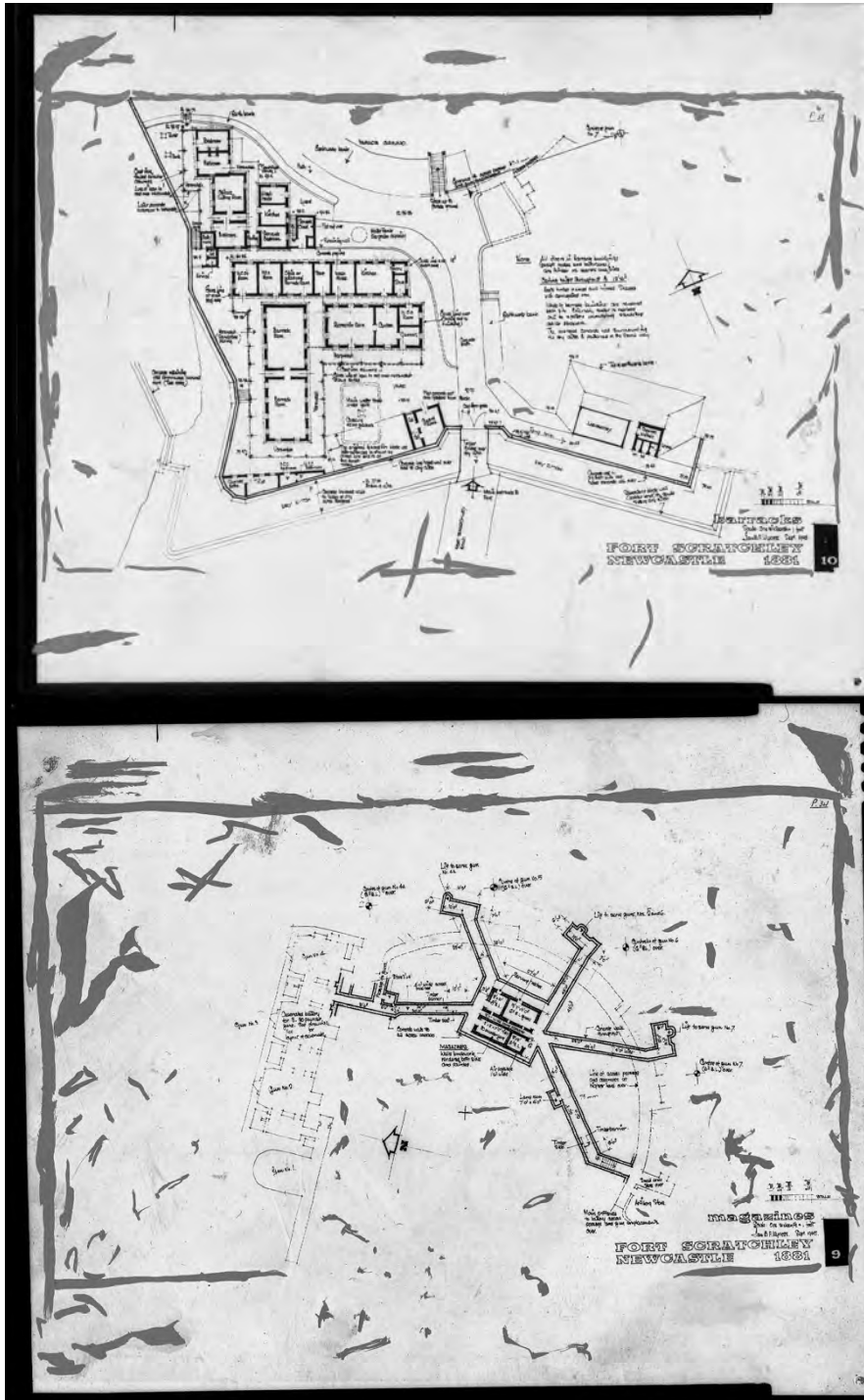
2. Drawings from 1881











3. BUILDER- James Russell

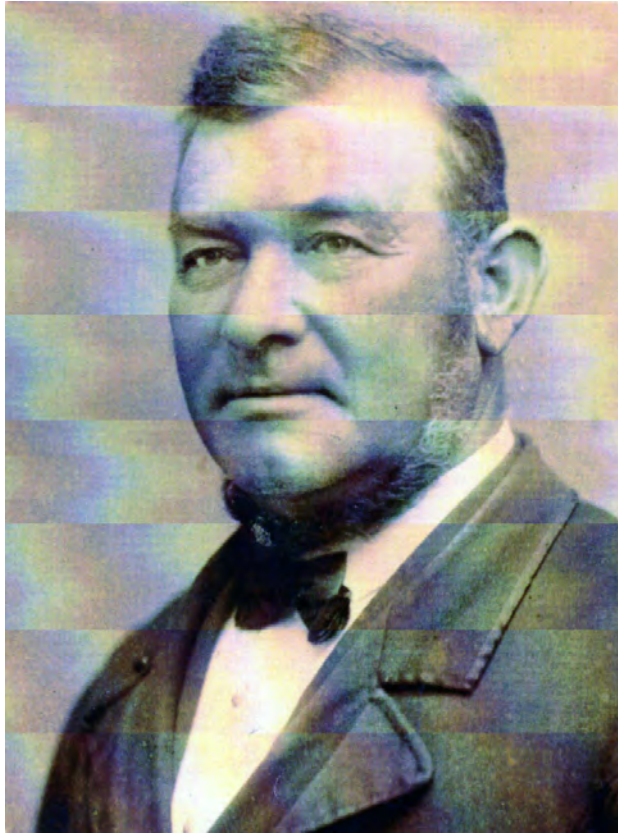


Figure 15 James Russell- Photo courtesy of FS Historical Society

